

MNB/2073/2012

LICENSE AGREEMENT



to be concluded between

the **Magyar Nemzeti Bank**
Company Seat: 1054 Budapest, Szabadság tér 8.-9.
Tax number: 10011953-2-44
Represented by Pap Gyula

Hereinafter referred to as: **the Client,**

and

UBS Limited
Company Seat: London
Company register number: 2034362
Represented by: Dr. Bernd Schmid

Hereinafter referred to as: **the Licensor,**

Hereinafter jointly referred to as: **the Parties,** on the date and place indicated below, under the following conditions.

Definitions

As used in this Agreement, the following terms shall have the following meanings when used in initial capital letters:

"Agreement" means this License agreement together with its appendices.

"Data" means any data, other than Provider Data or Evaluated Data provided by Licensor to be loaded and/or stored in The SYSTEM for use solely in connection with the Software.

"Data providers" means third party providers or licensors from which Licensor obtains Provider Data for use with the SYSTEM.

"Documentation" means any instruction manual or other accompanying written materials for the Software.

"Evaluations" means mathematically derived approximations of opinions of estimated value for miscellaneous financial instruments, as further described in section 4.4.) below.

"Index Data" means data provided by an index service provider.

"Intellectual Property" means all (i) patents, patent applications, patent disclosures and inventions (whether patentable or not), (ii) trademarks, service marks, trade dress, trade names, logos, corporate names, Internet domain names, and registrations and applications for the registration thereof together with all of the goodwill associated therewith, (iii) copyrights and copyrightable works (including computer programs and mask works) and registrations and applications thereof, (iv) trade secrets, know-how and other confidential information, (v) waivable or assignable rights of publicity, waivable or assignable moral rights and (vi) all other forms of intellectual property.

"License" or "Subscription"- personal, non-exclusive, non-transferable license to use the SYSTEM and related technical and product support as outlined in the Appendices.

"Software" means software provided in connection with the SYSTEM.

"Subcontractor" shall mean the subcontractors enlisted by the Licensor in order to perform the Contract. Data providers shall not be regarded as subcontractors.

"Services" means the services described in 1.1.) and all related services rendered by the Licensor based on the present agreement and its appendices.

"Provider Data" means data obtained from Data providers (including Index Data) and provided by Licensor to be loaded and/or stored in the SYSTEM for use solely in connection with the Software.

"The SYSTEM" means the portfolio management system that includes the related Software, Data and Documentation and access to the Provider Data and Evaluated Data.

I. Subject of the Agreement, the License

1.1.)

1.1.1.) Based on the present Agreement:

- Licensor undertakes to enable the SYSTEM for Client's use at the seat of the Client (H-1054 Budapest, Szabadság tér 8-9.), for 6 users.
- Licensor hereby grants to Client 6 personal, non-exclusive, non-transferable licenses to use the SYSTEM and related technical and product support as outlined in the Appendices. Based on the above, on the Client's side 6 persons shall be entitled to use the SYSTEM (hereinafter referred to as: **Number of Licenses**) as outlined above and in the Appendices.
- Licensor undertakes to provide access to the support services (updates, patches, helpdesk service) provided by the producer of the SYSTEM.

1.1.2.) The Client shall be entitled to order - during and regarding the definite period of the Agreement laid down in section 3.1.1. - an optional number of licenses up to 9 personal, non-exclusive, non-transferable Licenses, pursuant to Appendix No. 1.

The Parties lay down that the above right of the Client to order optional licenses shall be construed in a way that the maximum number of total licenses (including the optional licenses) can be 15 (fifteen), and the Client shall have the right (but not obligation) to order new licenses - at any time, under the effect of the present Agreement -, if the total number of licenses currently used by the Client is under 15 (fifteen).

The Licensor accepts that the Client orders the optional licenses always with referring to the present contract but based on an ad hoc order.

By signing the present Agreement the Licensor states that the above option is free of any additional fees as e.g. option fee other than the License fee.

The Licensor accepts that the present Agreement does not establish ordering obligation for the Client in relation to the optional number of licenses laid down in the present section and the Licensor shall not enforce any claims especially damage caused by incitement claim against the Client based on this.

The modification of the number of licenses shall be subject to a preliminary discussion between the vocational contact persons of the Parties.

The Client shall order the optional licenses by sending a written SAP order with authorized signature to the Licensor via electronic mailing system. The order shall contain the conditions necessary for the due performance of the given service, especially the list of services ordered and the date of performance agreed previously by both parties. The ad hoc order sent complying with the above shall be after its receipt without delay confirmed by the Licensor in writing (via electronic mailing system), with authorized signature. All terms and conditions not regulated by the ad hoc order, shall be governed by the present Agreement.

1.2.) By signing the present Agreement the Client orders and the Licensor undertakes to perform activities subject to the present Agreement.

II.

License fee and payment conditions

2.1.1.) The Licensor shall be entitled to a fee, as defined below.

The license fee for the SYSTEM shall be calculated pursuant to the below schedule (the "License Fee"), will accrue from the date that the SYSTEM is installed at Client's site (the "Commencement Date") and will be billed in equal quarterly installments, after the performance of the Licensor's service for the given calendar quarter.

Schedule of net License fee in EUR

Band	Total number of users	Annual net fee, EUR	Extra user net fee/ user/year, EUR	Number of extra users	Total net fee/year, EUR	Unit net fee/month, EUR	Unit net fee/quarter year, EUR
a	b	c	d	e = b - a	f = c + (d * e)	g = f / b / 12	h = 3 * g
5	5	120 000	8 000	0	120 000	2 000	6 000
5	6	120 000	8 000	1	128 000	1 778	5 333
5	7	120 000	8 000	2	136 000	1 619	4 857
5	8	120 000	8 000	3	144 000	1 500	4 500
5	9	120 000	8 000	4	152 000	1 407	4 222
5	10	120 000	8 000	5	160 000	1 333	4 000
5	11	120 000	8 000	6	168 000	1 273	3 818
5	12	120 000	8 000	7	176 000	1 222	3 667
5	13	120 000	8 000	8	184 000	1 179	3 538
5	14	120 000	8 000	9	192 000	1 143	3 429
15	15	200 000	5 000	0	200 000	1 111	3 333

In the event that the given license is not effective from the first day of the calendar quarter, the Licensor shall be entitled to issue its invoice also for the fragment periods.

For purposes of this paragraph, "installed at Client's site" shall mean that the Software is enabled for use at Client's site and the first access to the SYSTEM has occurred and Client has access to such SYSTEM.

2.1.2.) The Licensor undertakes to provide the optional licenses determined in section 1.1.2.) for a monthly license fee calculated based on the schedule in section 2.1.1.) of the present Agreement.

The Parties also emphasize that in case of change of the number of licenses, the current unit fee of all licenses shall be recalculated pursuant to the schedule in section 2.1.1.)

The commencement date of the additional licenses ordered by the client shall be within one calendar week after the submission of the ad hoc order by the Client. In the case of mid-invoicing period commencement, the fee shall be calculated on a proportional basis.

2.1.3.) The amount of the License fee shall not be modified during 2011 and 2012. Thereafter, the Licensor shall have the right to submit a proposal in order to adjust the license fee on 1st January of each calendar year, ("the Day of Restatement"), for the first time on 1st January 2013, according to the MUICP (Monetary Union Index of Consumer Prices) rate fixed by EUROSTAT (the Statistical Office of the European Communities), as follows: The License fee shall remain unchanged during the year when this License Agreement is concluded, and thereafter in each calendar year, the indexed License fee shall be applied from January 1st of each year.

Licensor agrees that according to the Hungarian public procurement regulations, the above adjustment of the License Fee requires modification of the Agreement with reference to section 303 of the Hungarian Act on Public Procurement.

If the publication of the MUICP index is stopped or the index can no longer be used, for whatever reason, an index that is the most similar to the MUICP index and, if possible, is used in the Eurozone, shall be applied.

2.1.4.) The License Fee shall include all relevant costs of the Licensor that may arise connected to the performance of the service defined in section 1.1.). Additional services (such as Reports) would be agreed in advance with Client and be subject to Licensor's standard fees.

2.1.5.) In addition to the Licensor's fee, the Licensor may not enforce any claim or demand against the Client related to the performance of the tasks undertaken in the present Agreement except in respect of Additional services agreed between Licensor and Client.

2.2.) By signing the present Agreement the Licensor agrees that in the event that the Licensor issues and presents its invoice not complying with the way and deadline laid down in the Agreement, the Client shall be entitled to send back the invoice to the Licensor without settling it, and the Licensor shall be obliged to issue its invoice again, and the date of the issuance of that invoice shall not be earlier date than the day when the Client sent back the original invoice which was issued by the Licensor in a way not complying with the rules of the Agreement.

2.3.) The Licensor's fee shall be paid by the Client to the Licensor pursuant to section 2.5.), within 30 calendar days after the issuance of the invoice by the Licensor by wire transfer to the account indicated in the invoice of the Licensor.

2.4.) The payment of the invoices shall be performed pursuant to the effective rules of payment of consideration determined in the Hungarian Act on Public Procurement, the detailed order and practical process of which is laid down in Appendix no. 3. of the present Agreement.

2.5.) The precondition of invoicing is that the Licensor has fulfilled its task subject to the present Agreement.

2.6.) The Licensor shall indicate the SAP number identifying the obligation of the Customer in the invoice. The SAP number shall be provided by the Accounting and Finance Division of the Client after the signing of the present Agreement. In case the Licensor does not indicate the Agreement number in the invoice the Client is entitled to return the invoice unpaid to the Licensor and as long as the Licensor does not send the invoice which is in conformity with the formal requirements prescribed by the legal regulations and the present Agreement to the Client; the Licensor is in delay of invoicing and this delay of Licensor excludes the simultaneous delay in payment of the Client.

2.7.) The Licensor shall issue and send its invoice to the following address: MNB Accounting and Finance Division, 1850 Budapest.

2.8.) The settlement of the invoice shall take place with reservation of all of the Client's rights related to the deficient performance or other breach of agreement by the Licensor.

2.9.) In the case of late payment of the Client the Licensor shall be entitled to charge interest for late payment up to 3% per annum, for each payment of the delay. In the case of late payment of the Client in the case of the delay of payment exceeding 14 days attributable to the Client, the Licensor shall be entitled to bind the further performance of the service to a modification of payment conditions or suspend the performance of the service.

2.10.) If the Licensor does not issue the invoice in conformity to the agreement, the Client shall be entitled to send the invoice back within 5 working days from its receipt and deny settlement of the invoice without the consequences of delay. In such case the Licensor is not entitled to suspend or terminate the further performance of the agreement.

2.11.) By signing the present Agreement, Licensor agrees that the Client is entitled to set off its receivables existing against the Licensor to the consideration due to the Licensor. Only those receivable may be set off, which are homogenous, expired and not contested by the Licensor.

III.

Term, termination and suspension

3.1.1.) This Agreement enters into force on 1st January 2012. and is concluded by the Parties for an indefinite period. Either party shall be entitled to terminate this Agreement with one hundred and twenty (120) days notice in writing to the other party.

The effective date of termination shall be the (i) 120th day after notice of termination is given, or (ii) the date specified in the notice.

3.1.2.) The Client shall also be entitled to reduce the Number of Licenses, at least thirty (30) calendar days before the 1st day of each calendar quarter, with a notice in writing to the Licensor. This notice terminates the Agreement regarding the number of Licenses indicated in the notice only.

The effective date of the above reduction of number of Licenses shall be the 1st day of the given calendar quarter.

The Client shall be entitled to exercise the right of reduction of number of licenses with the restriction that the total number of licenses shall not be less than 5 (five).

3.2.) Notwithstanding the foregoing, either party may immediately terminate this Agreement on written notice to the other party in the event of

(i) a material breach of this Agreement by the other party which is not cured within thirty (30) days after receipt of a written notice of such breach from the non-breaching party;

(ii) any injunction, order, judgment, decree or regulatory restriction imposed upon the the other party by any government, state or other entity exercising executive, legislative, judicial, regulatory or administrative functions, that materially and adversely affects the other party's ability to perform its obligations under this Agreement, or

(iii) the Insolvency of the other party.

Sections that by their nature are intended to survive, shall survive termination of this Agreement.

3.3.) The Licensor may without terminating this Agreement suspend the provision of SYSTEM to Client in whole or in part until further notice with immediate effect:

(a) to test, repair, modify, maintain or improve the SYSTEM;

(b) to comply with any order, instruction or request of any government, or other competent administrative or regulatory authority;

(c) if The Licensor has reasonable cause to believe that the SYSTEM is being used fraudulently or in such a way as to constitute a breach of the provisions of this Agreement ,

(d) where, in the opinion of The Licensor, circumstances outside The Licensor's reasonable control make such suspension necessary or desirable.

The Licensor will give Client as much notice as is reasonably practicable of any such suspension and will use its reasonable endeavors to reinstate the provision of the SYSTEM as soon as reasonably practicable.

IV.

Details of the service

4.1.) Connection

Client shall be solely responsible for the maintenance of a capability to initiate connection to Licensor's file transmission protocol (hereinafter referred to as: ftp) server and other parts of the SYSTEM for the purpose of retrieving updates via ftp and otherwise interacting with the SYSTEM, and Client shall be solely responsible for resolving all issues relating to Client's computer systems and/or computer firewall in conjunction therewith. If Client wishes Licensor to provide remote access support via a connection to Client's workstation(s), then Client shall be responsible for the acquisition and maintenance of an appropriate connection methodology and remote access software compatible with those used by Licensor.

4.2.) Main requirements of minimum level of service

- Operation time: on working days from 7 AM to 7 PM (CET),

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During the above operation time:

- Total monthly downtime of the System shall not exceed 12 hours.
 - Downtime of the System the length of which is between 4 and 6 working hours shall not occur more times than twice in a month.
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 - Downtime over 6 working hours shall NOT occur.
- Client's sole remedy for any breach of this clause 4.2 shall be as set out in clause 6.2.1. Client must provide independent evidence of any failure of service.

4.3.) Support

Licensor will use its reasonable endeavours to provide timely support between the hours of 8am and 6pm UK time on every business day in London. Client may contact UBS to request reasonable support via telephone and e-mail to such telephone number(s) or email addresses given to client from time to time for that purpose.

4.4.) Updates to the General terms and conditions of the Licensor

Updates to the General terms and conditions of the Licensor will come into force when the revised form is provided to Client, and such revised General terms and conditions of the Licensor will supersede all previous versions of the General terms and conditions of the Licensor. Modifications to the General terms and conditions of the Licensor may not be made which act to materially diminish the service levels set forth in the current General terms and conditions of the Licensor.

In the event that the Client exercises its right of termination with 120 days notice laid down in section 3.1.), within 15 days after the revised form of General terms and conditions of the Licensor is provided to Client, the revised General terms and conditions of the Licensor shall not supersede the former version, and the former version shall be regarded as effective General terms and conditions of the Licensor until the end of the notice period, except for the case that the above is otherwise provided in the written notice of termination by the Client.

4.5.) Data providers

It is understood that Licensor is obtaining information from Data providers. Nothing in this Agreement shall be construed by any of the parties hereto, or by any third party, as constituting Licensor and the Data providers as principal or agent, partners or joint venturers, or to be in any other trust, fiduciary or confidential relationship, nor will anything herein (except as otherwise specifically provided) render Licensor or the Data providers liable for the debts or obligations of the other. It is understood and agreed that the only relationship between Licensor and the Data providers is that of independent contractors.

Licensor may provide market data ("Provider Data") to Client through the Services. Certain Provider Data may be obtained by Licensor from third parties ("Data providers"). Client acknowledges that Licensor's use and distribution of Provider Data is subject to the terms and conditions of Data Providers and accordingly, Client undertakes to comply with the UBS DELTA™ Market Data Terms and Conditions accessible from the SYSTEM, as updated, amended, replaced or superseded from time to time (a copy of which at the date of this Agreement is affixed hereto as Annex D of the General Terms and Conditions of the Licensor).

The Data providers retain all title and ownership of the Provider Data, including the original disk copy and all subsequent copies of the Provider Data, regardless of the form or media in or on which the original and other copies may exist. This Agreement is not a sale of the Provider Data or any other data provided with The SYSTEM or any copy thereof and Client shall not contest or challenge in any manner the Data provider's ownership of the Provider Data.

Client agrees to keep confidential and prevent and protect the contents of the Provider Data from unauthorized use and disclosure, and infringement or misappropriation, as described above in the immediately preceding paragraph. Client also agrees that misappropriation or misuse of the Provider Data shall cause serious damage to the Data providers and that in such event money damages may not constitute sufficient compensation to the Data providers; consequently, Client agrees that in the event of any misappropriation or misuse, the Data providers shall have the right to obtain injunctive relief in addition to any other legal or financial remedies to which the Data providers may be entitled. Client shall immediately notify Licensor, in writing, if it comes to the attention of Client that all or part of the Provider Data is being transmitted and disseminated, or being used by a third party without the prior written consent of Licensor and the Data providers, and will take reasonable steps necessary to prevent the continuation of such activities. Client acknowledges and agrees that in the event certain of Licensor's rights, permissions or approvals pertaining to the Provider Data are canceled; terminated, rescinded or not renewed, Client's right to use the affected portions of the Provider Data shall automatically terminate, which termination shall not constitute a breach by Licensor of any of its obligations hereunder.

4.6.) Subcontractors

In case the Licensor involves a subcontractor in the performance of the work, then it shall be liable for the performance of the subcontractor as if it would have acted itself. The Licensor is solely liable for the fees and costs of the subcontractor.

4.7.) User restrictions; ownership of materials

During the term of this Agreement, Client is entitled to simultaneous use of the Software at the named sites by the number of concurrent users per site agreed upon by the parties pursuant to this Agreement. No other local area network, wide area network, telephone dial-up, Internet, TCP/IP or other connection may be made to access the service or its components by affiliates or subsidiaries of Client, except as otherwise agreed by Licensor. Licensor retains all title and ownership of the Software, including the original disk copy and all subsequent copies of the Software, regardless of the form or media in or on which the original and other copies may exist. This Agreement is not a sale of the original Software or any copy.

The Software, Data and Documentation are owned by Licensor and the Provider Data is owned by the Data providers. The Software, Data, Documentation and the Provider Data are protected by copyright laws and international treaty provisions. Therefore, Client must treat the Software, Data, Documentation and the Provider Data like any other copyrighted material (e.g., a book or a recording).

Client may not use the Data and the Services in any manner that is not expressly granted in this Agreement. All rights not specifically granted in this Agreement are expressly reserved by Licensor. Without limiting the generality of the foregoing, unless expressly permitted in the Agreement, Client may not:

- i. publish, transfer, display or grant direct or indirect access to any Service or Derived Materials to any third party or to any person who is not a User or who is outside the permitted Locations;
- ii. duplicate all or any part of the Services;
- iii. modify, improve, manipulate, translate, reverse-engineer, decompile or disassemble any Service or any part thereof;
- iv. use the Services or Licensor's or a Provider's name in connection with a prospectus or the creation, issuance, offer, or promotion of a financial instrument or security;
- v. use any Service for the benefit of a third party other than with respect to third parties whose assets are managed by Client or who have brokerage or trading accounts with Client;
- vi. use any Service for the purpose of designing, modifying, or otherwise creating any service, software program, or model that performs functions similar to, or that compete with, the Services;

vii. distribute, display, transmit, or make available to a third party any security identifiers or Licensor identifiers delivered with the Services without first obtaining written consent directly from the owner of such identifiers;

viii. use any Service in a manner that would substitute for the addition of a User or a license or purchase of any portion of a Service; or

ix. cause, permit, or authorize others to do any of the above.

Client agrees upon termination of this Agreement to immediately return to Licensor the Software, Data, Provider Data, Documentation and all portions and copies thereof, and other equipment supplied with the service (excluding any reports received by Client previously generated by the Software of the type described in Section 6). Client also agrees to certify in writing as to the return of the Software, Data, Provider Data, Documentation and all copies thereof.

4.8.) Client User

Client acknowledges and agrees that, subject to confidentiality regulations of the general terms and conditions of the Licensor, the Licensor may collect and maintain personal data regarding Client Users (limited to their name, job title and contact details). Such personal data will be used solely for the purpose of administering access controls. Client agrees to procure that each Client User has consented to the collection, processing and transfer of his/her personal data. Client shall use its reasonable endeavors to ensure that each Client User notifies Client of any changes to his/her personal data and Client shall where relevant notify the Licensor of the same without delay.

4.9.) Use of Evaluations Data

In the event that Client at any time accesses Data comprised of Evaluations of securities and certain other Data related to such securities, the following additional provisions shall apply:

Client acknowledges that securities are complicated financial instruments. There are many methodologies (including computer-based analytical modeling) available to generate approximations of their market value, and there is significant professional disagreement about which is best. Evaluation methods, including those used by Licensor or its Data Providers, may not generate approximations that correspond to actual "traded" prices of the instruments. Evaluations are not the transaction price at which an investment can be purchased or sold in the market.

Evaluations are based upon certain market assumptions and evaluation methodologies reflected in proprietary and/or confidential algorithms and may not conform to trading prices or information available from third parties; and

Client acknowledges and agrees that it assumes all responsibility for edit checking, external verification of Evaluations, and ultimately the appropriateness of use of Evaluations and other pricing Data in Client's applications, regardless of any efforts made by Licensor in this respect.

V.

Warranty and liability, intellectual property rights

5.1.) Warranty limitations

Licensor warrants only: (i) that it has the right to provide Client with access to the SYSTEM in accordance with this Agreement, and (ii) that the SYSTEM shall conform to the Documentation and shall operate in accordance with Licensor's written representations to Client. If the SYSTEM fails to perform in accordance therewith, then the sole warranty obligation of Licensor and the Data providers shall be to use reasonable efforts to remedy such failure and to conform to the express covenants and conditions set forth in this Agreement.

5.2.) Liability limitations

5.2.1.) Licensor will accept liability without limit for: (i) death or personal injury caused by its negligence or the negligence of its employees acting in the course of their employment; (ii) any fraudulent pre-contractual misrepresentations made by Licensor on which Client can be shown to have relied; and (iii) any other liability which by law Licensor cannot exclude; and nothing in this Agreement shall limit any such liability. This does not in any way confer greater rights than Client would otherwise have at law.

5.2.2.) Subject to clause 5.2.3.), Licensor will accept liability for loss or damage arising out of any breach of this Agreement or any tort (including negligence) committed by Licensor in connection with this Agreement provided that Licensor's liability to pay damages will not exceed the Liability Cap (in aggregate). Licensor's Liability Cap for the purposes of this clause shall be the greater of the Charges paid by Client in the 12 months prior to the event giving rise to the claim first occurring, and £10,000.

5.2.3.) In no event shall Licensor be liable for:

- (a) any loss of goodwill, reputation or opportunity; any loss of revenue or profits; any loss of anticipated savings; or any loss of or corruption of data;
- (b) any loss or damage arising out of any breach of this Agreement on the part of the Client;
- (c) any loss or damage arising out of any error by the Client or any Client User in inputting the Client's data into the System; or
- (d) any other Client or Client User error and any Client hardware or system faults or failures;

in each case of the foregoing (a) - (d) whether direct or indirect; or

(e) any indirect or consequential loss or damage;

1. which in each case of the foregoing arises out of or in connection with this Agreement or any breach or non-performance of this Agreement no matter how fundamental (including by reason of licensor's negligence) whether or not licensor had been informed of or was aware that there was a serious possibility of such loss.

5.2.4.) Any legal proceedings arising from this Agreement must be brought within: (a) 3 years from the date when the party bringing the proceedings first becomes aware or ought reasonably to have become aware of the facts which give rise to the liability or alleged liability; or (b) any relevant statutory limitation period; or (c) 3 years from the date of termination of this Agreement, whichever is the earlier. Client will not, under any circumstances, bring any claims of any nature (whether in tort (including negligence) or contract or otherwise) against any of Licensor's individual directors, officers, employees, contractors or agents where such claims arise out of or in relation to the subject matter of this Agreement.

5.2.5.) Clauses 5.2.1.) to 5.2.5.) above set out licensor's entire liability in respect of this Agreement and to the extent permissible by law, licensor will have no further liability for any loss or damage however caused arising under or in connection with this Agreement or in connection with Client's use of the Services whether in contract, tort or otherwise.

5.3.) Liability insurance

The certification by the insurance broker of the Licensor proving that the Licensor has liability insurance forms inseparable part of the present Agreement and is attached as Appendix 1. to the present Agreement. The Licensor shall be obliged to maintain the insurance described in this clause (or equivalent insurance) until at least 30 days after the term of validity of the present Agreement.

5.4.) Force Majeure

Each party's performance hereunder shall be excused without liability in the event of any event or contingency beyond such party's control, including but not limited to: foreign or domestic embargoes; acts of God; terrorist acts; the adoption or enactment of any law, ordinance, regulation, ruling, or order directly or indirectly interfering with performance hereunder; lack of the usual means of transportation; technological failure; fires; floods; explosions or strikes; earthquakes.

5.5.) Intellectual Property Rights

The Licensor warrants that it has the right to grant the licence set out in clause 1.1.) All title, ownership rights and intellectual property rights in the SYSTEM, including but not limited to the SYSTEM output and methodology, shall remain by the Licensor. Nothing on the SYSTEM shall be construed as conferring any licence save as expressly set out herein of any of Licensor's or any third party's intellectual property rights, whether by estoppel, implication or otherwise.

Licensor shall indemnify and defend Client for any sum Client may be ordered by a court of competent jurisdiction to pay to a third party as a result of a final, binding, unconditional and unappealable judgment of that court (plus reasonable legal costs and expenses) in final settlement of any claim or action made by that third party against Client due to Client's use of SYSTEM in accordance with this Agreement infringing upon the intellectual property rights of that third party, provided that Client:

- (a) gives prompt notice to Licensor of any copyright infringement claims upon becoming aware of the same; provided however, Client's failure to give prompt notice shall not constitute a waiver of Client's right to indemnification and shall affect Licensor's indemnification obligations only to the extent that Licensor's rights are materially prejudiced by such failure or delay;
- (b) gives Licensor the conduct of the defence to any claim or action in respect of any copyright infringement and does not at any time admit liability or otherwise attempt to settle or compromise the said claim or action except upon the express written instructions of Licensor;
- (c) acts in accordance with the reasonable instructions of Licensor and gives to Licensor at Licensor's expense such assistance as it shall reasonably require in respect of the conduct of the said defence including without prejudice to the generality of the foregoing; the filing of all pleadings and other court process and the provision of all relevant documents; and
- (d) acts reasonably in seeking to mitigate or avoid all losses or expenses which may be covered by such indemnity.

VI. Penalty

6.1.) In the case of non-fulfilment or default fulfilment of the Agreement, the Licensor shall be obliged to pay penalty as defined below. Limitations of liability or warranty shall not be applied in the scope of effect of the present title determining the rules of penalty.

6.2.) In particular, non-fulfilment of the quality requirements specified in the appendices of the present Agreement and of legal and contractual provisions shall be deemed a lack of conformity.

6.2.1.) In case of access based services: In the event that the Licensor exceeds the downtime limits of service level requirements laid down in section 4.2.), the Licensor shall pay a sum equal to the net licensor's fee for one day per every day effected by the breach of the service level requirements of the Client as **penalty for default or late performance**.

The maximum amount of penalty shall not exceed 20% of the quarterly net license fee.

6.2.2.) In case of optional orders: in the event that the Licensor does not fulfil its obligation until the deadline specified in the Client's reminder, except for the case of force majeure indicated in point 5.4.), then

The Licensor shall pay 2.5% of the given calendar quarter net license fee per day to the Client as **penalty for default or late performance**.

The maximum amount of penalty shall be 20 % of the given calendar quarter net license fee.

6.3.) In case of frustration of the Agreement attributable to the Licensor, the Licensor shall pay 20 % of one calendar years's net license fee (calculated based on the current number of licenses) to the Client as **penalty for frustration**.

6.4.) The Client may also enforce its direct damage claims above the amount of the default penalty against the Licensor, but the liability limitation written in clause 5.2.) shall be taken into consideration. The Client shall send the Licensor an accounting notification of the amount of penalty to be executed. In the event of emergence of penalty for default or late delivery the Licensor shall indicate in its invoice the fee due to the Licensor based on the Agreement, the penalty as a negative amount, and the amount to be paid (financially settled) by the Client as balance of the above.

VII.
Other provisions

7.1.) The Parties declare that they have the approval of their decision-making body to sign the present Agreement. The Parties declare furthermore that their representatives signing the present Agreement legally represent the company and have the authorization required to sign the present Agreement.

7.2.) The Parties declare furthermore that they are not under bankruptcy or liquidation proceedings and that no consent of any third party or authority is required for the validity of the present Agreement.

7.3.) If any of the Parties does not strictly adhere to the provisions of the present Agreement on one or more cases, or to the exercising of a right, a remedy or option, this shall not mean that such condition, right or remedy shall be waived by that party in the future or that party shall withdraw any of its claims.

No term or provision hereof shall be deemed waived and no breach consented to or excused, unless such waiver, consent or excuse shall be in writing and signed by the waiving party. Should either party consent, waive or excuse a breach by the other party, such shall not constitute a consent to, waiver of, or excuse of any other different or subsequent breach, whether or not of the same kind as the original breach. No amendment of this Agreement shall be effective unless in writing and signed by authorized representatives of both parties.

7.4.) The Parties agree that both of them shall bear their own costs in relation to the conclusion of the present Agreement.

7.5.) The parties are aware that the present Agreement may only be modified by mutual consent in writing. By signing the present Agreement, the Licensor declares that it has reviewed all documentation and other relevant document relating to the present Agreement in its own responsibility in the interests of fulfillment of the present Agreement prior to the conclusion of the present Agreement. With regard to the above, no modification of agreement may be initiated with referral to possible mistakes or deficiencies of the documentation or the other relevant documents.

7.6.) The Parties agree that claims under this legal relationship may not be assigned or transferred to any third persons (except the rightful legal successor of the Licensor and the contractual successor of the Licensor, on condition that the contractual successor of the Licensor is accepted in written form by the Client) and may not be used as security in a loan or credit facility agreement or in any other legal relationship.

7.7.) Denomination of the representatives and the method of communication

All notices, requests, questions under the present Agreement shall be made in writing and deemed to be made in the following manner:

- a) at the time of receipt if handed over by hand in turn of a confirmation receipt;
- b) at the time of receipt if sent in a registered mail with a confirmation notice, or via courier
- c) at the time of successful delivery stated by facsimile or email, if sent by facsimile or e-mail (activity or delivery report).

Denomination of the representatives and contact persons

Client:

Entitled to make a statement:

Béres Andor

E-mail: beresa@mnb.hu

Tel: 428-2600 / 1801

Fax: 428-2546

Technical matters

Papp István (ISZ)
E-mail: pappi@mnb.hu
Tel: 428-2600 / 1556
Fax: 428-2544

Technical matters (PDP)

Rékási Róbert
E-mail: rekasir@mnb.hu
Tel: 428 - 2600 / 4037
Fax: 428-2529

Technical matters (IKK)

Vereszkó-Varga Péter
E-mail: vereszkip@mnb.hu
Tel: 428 - 2600 / 15-34

Horgász Erik
E-mail: horgasze@mnb.hu
Tel: 428 - 2600 / 15-34

Licensor

Entitled to make a statement:

Matters connected with the agreement

Dr. Bernd Schmid
E-mail: bernd.schmid@ubs.com
Tel: +44 20 7568 7651
Fax: +44 20 7567 0866

Matters connected with the daily routine

In a special letter, person(s) designated in advance.

7.8.) Each party acknowledges that it has read this Agreement and that together with all written amendments, exhibits, and schedules, this Agreement constitutes the entire and exclusive agreement between Client and Licensor with respect to the subject matter hereof, and supersedes any previous agreement or understanding between the parties and no statement, agreement, or understanding not contained herein shall be enforced or recognized.

7.9.) If any provisions of the present Agreement are or become invalid or unenforceable, this does not affect the validity or enforceability of the whole agreement or its other provisions. In case of partial invalidity, the Parties shall conclude a new modification of the Agreement which is as close to the business intentions and legal content of the original contractual provisions as possible but is in conformity with legal regulations. In the case of dispute, the court may establish the new contractual condition and may supersede the Party's statement with its judgment.

7.11.) The Parties shall endeavor to settle all disputes arising under the present Agreement or in relation to it, its breach, termination, validity or interpretation by way of negotiation. If the Parties do not achieve a written settlement within 30 (thirty) days following commencement of the negotiations, the Parties stipulate that such dispute shall be referred to the competent court with due jurisdictions.

7.12.) The present Agreement consists of 13 (thirteen) numbered pages and 6 (six) Appendices and has been drawn up in four (4) identical original copies every page of which was signed by the representatives of the Parties. By signing the present Agreement the Licensor gives its consent to the Client to publicize the scanned copy of the Agreement. By signing the present Agreement the Licensor acknowledges that the tenor of the present Agreement shall not be qualified as business secret.

7.13.) **Inseparable parts of the agreement:**

- Appendix 1: Specification of requirements.
- Appendix 2: Extract of the tender offer of the Licensor.
- Appendix 3: Detailed rules of payment of the consideration
- Appendix 4: Statement of authorization
- Appendix 5: Certification by the insurance broker of the Licensor
- Appendix 6: General terms and conditions of the Licensor

7.14.) All terms and conditions not regulated by the present Agreement shall be governed by the mandatory provisions of the Hungarian Act CXXIX of 2003 on Public Procurement and Act. CXXII. of 2009. All further terms and conditions not regulated by the above acts shall be governed by General terms and conditions of the Licensor and the law of the United Kingdom. The courts of England and Wales will have the exclusive jurisdiction over any dispute arising out of this Agreement (including non-contractual disputes).

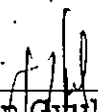
In case of any discrepancy between the wording of the agreement and the General terms and conditions of the Licensor, this Agreement shall be regarded as governing.

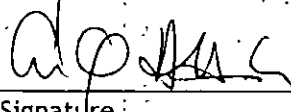
The Parties have, after reading and interpreting, signed the present Agreement as fully conforming to their wills:

Budapest, 31st December 2011.

Signed for and on behalf of Magyar Nemzeti Bank by:

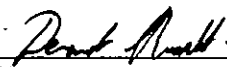
Place, Date

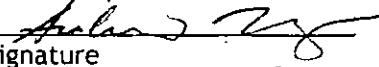

 Signature Pap Gyula
 Name igazgató
 Function


 Signature
 Name Székely Attila,
Központi beszerzés
 Function vezetője

Signed for and on behalf of Licensor (UBS Limited) by:

Place, Date


 Signature
 Name PETER SMITH
 Function M-D. GLOBAL HEAD UBS DEITA


 Signature
 Name ANDREW TSE
 Function MANAGING DIRECTOR

m 



MAGYAR NEMZETI BANK

Contracting partner:

Technical Specifications

Subscription to IT system supporting portfolio management

Project manager:	Katalin Kelemen
Scheduled commencement date:	31 May 2011.

Szakasz\Végső ajánlattétel\Tender documentation_FINAL BID_Portfolio management system subscription (126_2010).doc - Dokumentum

Utolsó mentés: 2011. 12. 29.

APPENDIX 1

Version	Date	Modified by	Description of modification
1.0	14-01-2011	Katalin Kelemen	implementation
2.0	24-01-2010		transposition of opinions

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1 OBJECT OF PROCUREMENT

The Magyar Nemzeti Bank is planning the introduction of a multifunctional IT solution supporting the management of foreign currency reserves.

The object of procurement is the introduction of a portfolio management system and the provision of subscription at the Magyar Nemzeti Bank for the planned contractual period, in accordance with the specifications, and the provision of access to support services provided by the producer of the system.

The system to be introduced shall satisfy the analytical and decision support demands of reserve management at a high level, to an extent possible under current best practice.

The system is introduced at the bank for the purpose of improving foreign currency reserve management on the software side, the realisation of higher yields and the reduction of risks of low probability, but of very large amounts.

The procurement hereunder does not serve the development of the interface.

2 ARCHITECTURAL ENVIRONMENT

Guidelines are provided in the document entitled "Requirements relating to IT developments", particularly Chapters 4, 5 and 8 and Annex 1 thereof.



IT development requirements.doc

We wish to note that the Internet connection in the IT Infrastructure is realised through a Proxy server, with the use of firewalls operating with content filters. A high level NTLM (NT LAN Managing) login method is in place at the MNB, therefore a login method of a lower level (e.g. Basic Authenticated) is not supported.

For security reasons, the download of binary code is generally not permitted through the content filter of the MNB network infrastructure. If the service provider is able to operate the service through the open Internet only in this form, this is only possible through an encrypted channel (HTTPS) and by Bank Security authorisation of the necessary ports and protocols, without violation of the principle of trust.

3 REQUIREMENTS

The Contracting Authority sets out the following requirements relating to the application.

3.1 Data content and data management features

3.1.1 Data content

1) It is capable of managing the asset classes belonging to the MNB investment universe and contains as much specific securities as possible.

It shall manage the following asset classes¹ on a mandatory basis:

- bonds (bullet and amortising, FRN, inflation linked, optional bonds),
- ABSs,
- MBSs
- CP, CD
- money market placement and cash
- bond, interest rate and swapnote futures,
- credit default swap,
- interest rate and currency swap (IRS-CIRS),
- FX-swap.

Optional:

- Repo, tri-party repo
- interest rate futures option,
- otc bond option,

The master database of the service provider containing the market instruments shall cover the current and potential (included in the investment universe) assets of the MNB portfolio.

The method shall enable the recording of securities that are not contained in the system. With the help of recorded data, the application shall be capable of instrument pricing, calculation of sensitivities relating to the relevant market risk factors and use in the reports provided by the system. If the recording or pricing of individual instruments thereby constitutes "exception-handling", and this does not require major labour expenditure on the side of the MNB, it may maximally occur to a limited extent with respect to the number of securities.

2) Price data source, checked price of good quality, with wide coverage.

A rate indicating price quality is, for example, the deviance of portfolio elements weighted with the portfolio or maximum absolute variation based on our own evaluation prices.

3) Wide access to relevant bond market indices

The system shall provide access to elements of the Barclays and/or iBoxx index family.

4) Descriptive information of necessary depth shall be available on the investment instruments

Mandatory fields for filtering applied for index customisation: special identification (at least ISIN in relation to bonds), size of issue, traded portfolio, date of issue, maturity, seniority/subordination, sector, type of securities, issuer, guarantor, issuing country, guarantor country, currency, coupon, description of optionality in case of optionality.

5) Access to credit risk rating data

Mandatory access to the credit rating of at least two (S&P and Moody's) of the three major credit rating agencies in relation to securities contained in the database. If the Fitch rating is not accessible in the system, uploadable field for the MNB rating should be available which can be used as an equivalent with the other rating fields in the course of reporting.

Extra function is data relating to the CDS spread of issuer.

¹ Sample portfolio is provided in the annex.

3.1.2 Data management

1) Customisable indices

The system shall enable the filtering of available indices on the basis of the accessible criteria, and the filtered sub-indices shall be mixable with each other. Extra function, if the filtering, mixes set up can be saved and used in the future.

2) Financial indices

Yield data: YTM, yield-to-worst in relation to securities with optionality, OAS (Libor and treasury as well).

Interest rate risk (also along the yield curve) sensitivities: modified duration, key rate durations, convexity.

Spread risk sensitivities: spread duration and key spread duration.

Vega value in relation to securities with optionality.

The indices shall be available at random times, not only at the level of individual securities, but also at a portfolio and index level and their subaggregates.

3.2 Functionality

3.2.1 Asset allocation

1) Support of strategic asset allocation

In the strategic asset allocation process, we search the cluster of optimal portfolios in the yield-risk space over a longer time horizon (minimum 1 year, maximum 5 years). The optimisation of specific securities is inadequate for this purpose due to their ageing, i.e. change; the asset needs to enable abstract instruments (e.g. current 2-year German government securities). The risk model of the service shall support such types of (constant maturity or generic) instruments.

2) Support of tactical decisions and portfolio management level decisions

The decisions are similar to the adoption of strategic decisions; but due to the shorter horizon, expectations are less stringent toward abstract investment instruments.

3) Newsletters, analyses, information and analyses relevant to the support of portfolio management and asset allocation.

3.2.2 Portfolio management

Benchmark tracking with minimal error with specific securities (or other instruments), in relation to which criteria may be defined in advance. The benchmark may be an index, own portfolio, or a cluster of the aforementioned abstract securities.

3.2.3 Risk analysis

1) Risk model

The asset shall have a risk model, currently in the mainstream, relying on the analytical values and market drivers listed above. The combined probability distribution of market drivers shall be taken into consideration. Extra functionality, if the modelling of the distribution margins receives special attention in the system. The service provider shall provide the user documentation of the risk model which enables assessment of the model's quality and any partial result may be reproduced.

2) Risk indices

The system shall also provide VaR (Value at Risk), TE (tracking error) risk indices based on different methodologies: historical, parametric, Monte Carlo simulation:

3) Stress test analysis

Generation of didactic, realistic and historical stress test scenarios

The systems are required to produce stress test reports. The first step is the elaboration of the scenarios: the extreme situations, market rates, price and spread movements that are expected. The system contains market movements witnessed in the course of historical crises (historical stress scenario), the scenario of common plus and minus 100 basis point market movements is easily prepared (didactic scenarios) and it helps in drawing up movements (estimated on the basis of volatility and correlations) that are considered realistic.

Correlated and uncorrelated scenarios

The user should be able to define scenarios that assess the combined effect of correlated market factors and the isolated effect of individual factors.

Stress reports

Two types of stress reports are necessary - one of these is a minimum requirement:

- in relation to sensitivity testing, the revaluation suffered by the portfolio upon the immediate occurrence of negative market events,
- in relation to multi-periodic testing; the final result of the report also contains the effect of market circumstances changing in the meantime (reinvestments).

4) Backtesting of strategies

Ex-post backtesting of ex-ante strategies and VaR estimates: issue of risk report retrospectively to a random date in the past, only with the help of information available on such date in the past.

3.2.4 Absolute and relative performance measurement and risk analysis.

1) Performance and risk breakdown model

Relative performance and risk breakdown: these reports are required to explain the exposures and effects of decisions contributing to the result in the given portfolio. The report should also explain the factors accounting for the difference between the portfolio and its benchmark and the amount of difference in performance it causes. It should be possible to run the report on random past periods.

Simple isolation of foreign currency revaluation results: aggregation of the performance of hedged portfolios of different foreign currency, statement of combined performance, comparison to the benchmark, whereby the result of foreign currency exposure does not appear in the statements.

3.2.5 Reporting

1) It should be possible to run reports with high resource demand in the background.

2) Report format: in an optimal case, the format can be selected and the user sets the format according to the purpose of the report. Minimum requirement of the exportability of the tables in a file format that can be managed in Excel.

3) Customizability of reports: the user should be able to define a report by using the features, data of the application, allowing the saving and reuse of such report definition.

3.3 Non-functional requirements

The operation, the maintenance of the system as well as uploading with the master data necessary for the operation and with the capital market index (excluding the user's transactions) constitute the continuous task of the service provider.

- Confidentiality and integrity
 - The Supplier shall evidence with an auditor's report or other certified instrument that it operates effective mechanisms in the supplied system which ensure that customer data cannot be accessed by third parties (confidentiality) or the positions modified by other than the customer (integrity).
 - The Supplier shall represent that it shall not use information it becomes aware of in its business transactions or for other purposes and agrees not to disclose such information to its departments responsible for business transactions.
- Requirements related to service levels
 - operating period: CET 7:00 a.m - 7:00 p.m. on business days
 - the continuous failure of the system may not exceed one business day,
 - the failure of the system of over 4 working hours may not occur on more than 2 occasions a month
- Data access restrictions (authorisation system)
 - Authorisation system is also necessary.
 - Setting of various authorisations for specific portfolios
- Restrictions
 - possibility of automated portfolio upload
- Security
 - in the event of a system error, the restoring of the MNB's position and work environment is enabled, where only changes of the last working day may be lost

3.4 Task schedule

Estimated schedule:

Activity	Commencement	Completion
Preparation of procurement procedure	15.03.2011	14.05.2011
Conducting of procurement procedures, contracting	15.05.2011	30.11.2011
Delivery, commissioning	01.12.2011	31.12.2011

3.5 Introduction of system

The introduction of the system serves the purpose of providing access to the application of the Supplier and the configuration of the system parameters.

Tasks to be performed by the Supplier:

- Planning of implementation in accordance with the technical requirements of the application
- Execution and documentation of tests to ensure adequate operation
- Holding of training or presentations
- Support of tasks necessary to go live

3.6 Training

The training serves to ensure the success of the introduction, use and operation of the IT application. For this purpose it is necessary to transfer know-how related to the use and operation of the application to the users and operators of the system.

The Tenderer is responsible for holding training sessions in the necessary quantity and areas and/or the provision of training material for the Contracting Authority in the following areas:

- operator functions
- use of application by users

3.7 Documentation

The documentation serves the purpose of transferring know-how related to the use and operation of the application to the (MNB and non-MNB) users and operators of the system.

Deliverable products, documents:

- User documentation,
- Operator documentation,
- Description of BCP

The Contracting Authority shall receive (and qualify as adequate) the user documentation from the Supplier prior to the commencement of user tests.

The Contracting Authority shall receive (and qualify as adequate) the operator and installation documentation from the Supplier prior to delivery for initial operation

3.8 Support service

Support service: The winning tenderer shall manage incidents occurring during the operation of the system delivered and introduced for the Contracting Authority and provide support for operating tasks.

Support by phone and e-mail is a requirement among the communications channels available for support.

The tenderer shall manage incidents and perform tasks in the framework of the support service. The support service shall be available on business days from CET 7:00 a.m. to 7 p.m.

The Contracting Authority has the right to use phone support in unlimited quantity.

The support service shall be provided for a period corresponding to the period of subscription.

The tenderer shall manage incidents in the framework of troubleshooting. The error causing the incident shall be eliminated in the course of troubleshooting.

The causes of error may be the following in the implemented environment:

- the application aborts during operation without an error message,
- during operation the given functionality of the application becomes unusable, unusability is also indicated by an error message,
- operation generates output with insufficient or incorrect data content,
- incorrect operation resulting from insufficient or incorrect parameter configuration settings,
- incorrect operation resulting from insufficient or incorrect environment (firewall, authentication, web service access, etc.) settings,
- software error resulting from hardware error or other software error,
- database damage,
- operating errors.

Incidents are reported on business days from CET 7:00 a.m. to 7 p.m.

Service periods relating to incident management (from time of reporting):

		Deadline	
Qualification of errors	Urgency	Response	Solution
Critical	Critical	2 hours	4 hours
Serious	High	4 hours	24 hours
Other	Normal	8 hours	48 hours

All times are working hours, all business days are 8 working hours.

If the management of the incident is not possible during the time available for the solution, the Supplier shall notify the Contracting Authority of such fact as soon as practicable.

Reports are prepared on the service on a monthly basis.

Category	Description
Critical error	The error is critical if the system is unusable; or the error prevents the intended use of any other serviceable function by users; or it causes database inconsistencies or data loss repairable only with major labour input; or the application becomes otherwise unfit for intended use; or it prevents access to a function from a business point of view; or it violates the authorisation system.

Serious error	<p>The error is serious if the operation of the function does not significantly deviate from requirements and thereby users may use the system for a given, short transitional period, where the effect of faulty system operation may be corrected after the correction of the error (e.g. database consistency can be restored after a not too lengthy period). Such errors may be, for example, a faulty or missing error message, lack of input validation, sluggish operation, navigation irregularities, faulty queries).</p> <p>During live operation, an error is deemed to be a serious error where its effect may be resolved temporarily and as a result, operation may temporarily continue.</p>
Other errors	<p>Other, minor errors include cases in which the operation of the function deviates from requirements only to a minor extent, primarily causing inconvenience for users which does not significantly obstruct the daily work process or cause repairable faults in the database (e.g. spelling error, bad header, dimensioning errors in display), i.e. errors not posing a general risk to operation.</p>

Method of incident reporting and work procedure:

- The contact person of the Contracting Authority reports his request to the contact person of the tenderer in connection with incident management and confirms the same in writing (by e-mail or fax). During notification, the contact person of the Contracting Authority also indicates the priority of the incident he qualifies.
- The time of notification shall in all cases be the time of notification confirmed in writing.
- The contact persons determine the type and procedure of incident management on the basis of available information. The contact persons shall make efforts to share information collected in the course of and relating to incident management.
- In connection with incident management, the tenderer shall report the performed repair activity and the time and duration thereof. The Contracting Authority shall certify the compliance of performance with the contract.

4 EXPECTATIONS REGARDING THE PROFESSIONAL CONTENT OF THE OFFER

I. Executive summary

The Tenderer shall briefly summarise and highlight the main points of his offer.

II. Preliminary implementation concept

With regard to the tasks and products specified in the 'Requirements' chapter:

- data content and data management;
- functionality;
- sample portfolio evaluation;
- provision of trial period;
- training and documentation;
- system introduction;
- support to live operation.

In connection with all the tasks to be performed, in his preliminary implementation concept the Tenderer shall explain the following in detail:

- what functions of the offered system perform the given tasks and how (tasks and activities to be carried out by the Tenderer);
- what products and documents are related to the necessary functionalities and with what contents the documents are linked with the necessary functionalities;
- for the performance of what activities, with what competence and to what extent, specified in man-days and number of people, the Tenderer intends to involve human resources from the Contracting Authority for the performance of the given task (personal conditions and sharing of responsibility).
- Provision of a trial period for 10 users: allowing access to the application at least between the first round of negotiations and the date of the announcement of the results. The Tenderer may also provide the trial period starting from the date of submitting the offer. The data of the sample portfolio shall be available for the Contracting Authority throughout the whole trial period.

III. Supplementary services

IV. Business offer

The Tenderer shall compile his business offer in compliance with the content and form requirements set out in the tender documents and in line with the specified structure.

Completeness of the offer: the business offer shall include all the costs of the Tenderer in connection with the implementation of the system, looking several years ahead. Accordingly, later, during implementation there shall not be any cost factors that are not included in the price now.

V. Annexes

The Tenderer may attach, as annexes, professional materials and documents that are related to the offer but not included in its above mentioned chapters due to their length or other reasons. However, the parts included in the annexes shall be edited in a formally uniform manner and with continuous numbering together with the other parts of the offer.

5 APPENDICES

APPENDIX 5.1: sample portfolio

The portfolio below is completely fictitious; it does not contain the positions of the MNB.



sample portfolio.xlsx

IT development requirements

V4.3



Prepared: April 2010

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1. Summary

The requirements defined in relation IT development projects were determined on the basis of the document entitled "**Medium term IT strategy of the Magyar Nemzeti Bank 2008-2011**".

The issue of the development requirements aims at supporting the implementation of the IT strategy in the course of carrying out tasks related to the development of new systems and the major modification of existing systems.

The purpose of the document is to provide information on general rules relating to the tendering of application and infrastructure developments for both the MNB and external parties concerned.

The document hereunder is not the sole description of development rules. Other rules are attached to specific contracts where necessary. The **IT Security Regulations (IBSZ)**, defining requirements and recommendations relating to **IT security** play an important role. Several regulations may set out provisions in connection with a given development project; in such case the most stringent provision shall take precedence.

Prior to the launching of the development projects, in the course of project preparation, it is necessary to qualify the application **according to confidentiality – integrity – availability criteria**. The **specific requirements**, relevant rules, **to be applied in the course of development may and need to be defined** on the basis of such qualification.

In the course of development, it is necessary to take into account the technology and operating framework of the systems and infrastructure services (operating systems, mail system, database management infrastructure, network topology, IT security systems, monitoring and management tools) to which it is compulsory to adjust. **In the course of development, the quantified or quality upgrading of the related infrastructure needs to be planned and implemented where necessary, including the introduction and operation of a new element if a new infrastructure element is necessary.**

The application of reliable integrated systems with high functionality and wide application is a requirement. If an adequate solution is in place for a part or whole of the task, the setup of the IT system needs to be planned in the framework thereof, and the development of a particular system is possible only in exceptional cases, on the basis of a relevant decision made in advance. The protection of existing, earlier investments which support and implement strategic objectives is assigned a priority.

Our medium term objective is the standardisation of connections between the applications, the setup of a communications channel jointly used by the systems. In relation to the implementation of data connections between the systems, platform and system independent solutions are required: WEB service (WEB-Service, WS-s), use of XML data format, forwarding of http-soap-xml data packages.

As a general rule, open and flexible applications need to be implemented. The applications shall not unnecessarily limit the freedom of the user, they shall support a flexible work process (e.g. it should be possible to save in Excel format a table received as a result for further processing, if not prohibited by a predefined rule)

In the course of implementing the applications, the individual functional layers – data management, business logic, user interface – shall be implemented to allow the modification, moving and configuration of the individual layers, and disable visibility of modification within the functional layer for the related layer(s).

The application systems that are important in terms of the bank's operation shall be implemented to enable their use of the high availability and fault tolerance provided by the technical-technological infrastructure.

The operation of a limited number of operating platforms is enabled to keep operating costs at a low level. The use of the IBM/AIX and Sun/Solaris platform is possible in relation to business critical applications and the Intel/Microsoft or open (Linux) platform for general purposes.

We operate our systems in virtual environments to continuously improve cost efficiency. The operating platform of the virtual systems is the VMware Virtual Infrastructure environment. The setup of a non-virtualized system is possible only on the basis of a separate, advance authorization procedure.

In relation to client side development, a so-called rich client solution running in a browser is required which combines the low maintenance expenditure requirement of browser based solutions with the user convenience of fat clients. In relation to all client solutions, the implementation of an automatic installation procedure is a mandatory requirement which adjusts to the MNB architecture performing client installations.

2. General requirements

The general requirements shall be observed in relation to both purchased and independently developed systems, other requirements depend on the general and individual features of the system.

2.1. General demands

In the course of planning the systems – in terms of both technical and financial aspects – all elements related to function and operation – hardware, software, other tools – shall be taken into consideration, irrespective of their availability. The resource and capacity plans shall reveal the total resource demand of the operational system (e.g. memory, data storage, licence, etc.)

- ✦ **For the purpose of reproducibility and verifiability**, it is compulsory to deliver automated procedures for the application which
 - are able to build an operating system copy (installation), upload it with initial data, and
 - migration of data of an already operating system copy, with modification of data content defined in the planning process of the system, where necessary, particularly in relation to the unidentifiability of business critical data and data affected by data protection laws.
- ✦ **The systems shall be measurable by the monitoring system**, therefore it is compulsory to prepare a monitoring transaction for the application which may be launched from the monitoring system and its result may be interpreted in the monitoring system, affecting all components of the system and each component is capable of inserting in it a time stamp marking the fact of operation, the beginning and end of the task.
- ✦ **The systems are expected to operate for a long time, without loss of performance**, the increase in the quantity of data may not substantially affect processing time. Unless provided otherwise by an individual provision, a 7 year operating period shall be considered when planning the systems.
- ✦ **The MNB requires the source code in the form of a purchase or deposit**. The MNB regulates the purchase of the source code of the developed systems or the deposit obligation thereof in the framework of the supply contract on the development project.
- ✦ **The MNB requires that the IT infrastructure (Annex 1) and operating order (Annex 2) of the Bank be taken into consideration**. In the planning and development process of the system, only solutions which ensure integration and operation of the deliverable system in the computer infrastructure may be applied.
- ✦ **In the course of development, the MNB may review (code review) the code in the development phase or its completed version**, with the participation of third parties, as well. The developer is required to ensure the continuous monitoring of compliance with the provisions of the document hereunder in the course of development.
- ✦ We require the production of clients that operate in the Microsoft Windows environment, **in accordance with the institution image (Annex 3) and the general user and industrial-professional expectations**.

3. Design and implementation of systems

The design of the deliverable system's architecture is based on the IT security risk analysis of the system performed in advance. The analysis shall be performed for each of the following criteria prior to the planning of implementation (or the availability, validity of an existing system verified):

- ✦ **confidentiality,**
- ✦ **integrity and**
- ✦ **availability.**

If a partial solution depends on several criteria, the most stringent requirement relating to the given partial solution shall be observed.

Evaluation shall be performed on the forms used by Bank Security, in accordance with evaluation rules.

3.1. Confidentiality

3.1.1. High

- **Data storage:** Solution using data encryption, either row level or content based access regulation. By default we expect the use of ORACLE RDBMS, other solutions may only be chosen after prior approval.
- **Application:** Signature and running of the code is permitted only after verification of authenticity.
- **User interface:** Thin or fat client, in browser, without installation.
- **Data connections:** Encrypted data connection from application to application.
- **Logging:** Digitally certified, authorization of person performing operation, protected independently from application.
- **Saving:** Accessible in encrypted form to restricted group of operators.
- **Monitoring:** Continuous transaction and data change monitoring, immediate alarming of professional or security monitoring upon violation of operating rules.

3.1.2. Medium

- **Data storage:** In database, with access regulation.
- **Application:** No separate rules.
- **User interface:** Thin or fat client, in browser, without installation.
- **Data connections:** Possibility of data transmission channel encryption if required.

- **Logging:** Operation and its executor is logged, the log protected with access rights.
- **Saving:** Centralized, accessible to restricted group of operators
- **Monitoring:** Subsequent accountability on the basis of regularly prepared reports (logs):

3.1.3. Low

- **Data storage:** No separate rules
- **Application:** No separate rules
- **User interface:** Thin or fat client, in browser, without installation.
- **Data connections:** Open, standard.
- **Logging:** Not necessary, applicable if required
- **Saving:** No rules, but use of centralized solution is recommended
- **Monitoring:** Not necessary

3.2. Integrity

3.2.1. High

- **Data storage:** Storage of digital certification information related to data
- **Application:** Signature and running of the code is permitted only after verification of authenticity.
- **User interface:** Thin or fat client, in browser, without installation.
- **Data connections:** Digitally certified data connection between the systems.
- **Logging:** Digitally certified, authorization of person performing operation, protected independently from application
- **Saving:** With digital certification.
- **Monitoring:** Possibility of continuous transaction and data change monitoring; immediate alarming of professional or security monitoring on authenticity breaches.

3.2.2. Medium

- **Data storage:** Optional choice of storage of digital certification information related to data.
- **Application:** No rules
- **User interface:** Thin or fat client, in browser, without installation
- **Data connections:** Optional choice of digitally certified data connection between the systems
- **Logging:** Operation and its executor is logged, the log protected with access rights.

- **Saving:** Centralized.
- **Monitoring:** Subsequent accountability on the basis of regularly prepared reports

3.2.3. Low

- **Data storage:** No separate rules.
- **Application:** No separate rules.
- **User interface:** Thin or fat client, in browser, without installation
- **Data connections:** Open, standard.
- **Logging:** Not necessary, applicable if required
- **Saving:** No rules, but use of centralized solution is recommended.
- **Monitoring:** Not necessary

3.3. Availability

3.3.1. High

- **Data storage:** at 2 sites, clustered; possibility of service from random site
- **Application:** at 2 sites, clustered, active-active (or at least active-passive) application server
- **User interface:** Thin or fat client, in browser, without installation.
- **Data connections:** Dual datapath between servers, with automatic routing
- **Logging:** No separate rules.
- **Saving:** Saves during the day and restore possibility for given operation or moment.
- **Monitoring:** Continuous monitoring and immediate notification of operator upon occurrence of error status.

3.3.2. Medium

- **Data storage:** at 2 sites, periodic replication of primary copy to reserve site; upon shutdown of primary site, rolling forward of reserve to last consistent status.
- **Application:** Cold reserve which may be launched shortly after shutdown of primary system
- **User interface:** Thin or fat client, in browser, without installation.
- **Data connections:** No separate rules.
- **Logging:** No separate rules.
- **Saving:** Daily saves and period replication of database.

- **Monitoring:** Continuous monitoring and notification of operator upon occurrence of error status.

3.3.3. Low

- **Data storage:** at 2 sites, the reserve copy contains a consistent status not older than 24 hours which may be used upon shutdown of primary copy.
- **Application:** Reinstallation on reserve server upon longer shutdown of primary system.
- **User interface:** Thin or fat client, in browser, without installation.
- **Data connections:** No separate rules.
- **Logging:** No separate rules.
- **Saving:** Daily saves.
- **Monitoring:** Monitoring for the checking of operating parameters, log entry on inadequate operation.

4. Implementation of application systems

4.1. General requirements

- Automatic installation procedures shall be prepared for the installation of components – programs, scripts, stored procedures, databases, etc. – necessary for the operation of the system.

4.2. User interface, presentation layer

- **Application of thin or rich client.** – In general cases – in the absence of specific decisions – the so-called rich client is applicable. If enabled by the simplicity of the application, the application of a thin client is also possible.

Thin client: Client with minimal tools which uses the necessary resources from a remote (server) computer; its function is limited to the display of data sent by the server

Fat client: The fat client is capable of independently processing larger quantities of data when the server primarily functions as primary storage.

Rich client: In this client architecture, the use of the central unit of the server is much more balanced than in the other cases. The client itself is basically a fat client, but it more effectively uses the network possibilities similarly to the thin client; thus it is basically a hybrid fat-thin client.

In our case, this means the combined use of the functionality of the browser run and the .NET framework, JAVA runtime environment and possibly other similar environment.

- **The Internet Explorer browser, .NET framework, JAVA runtime environment and the MS Office program package is available at the workplace,** in general cases the user interface is to be developed with the use of these tools
- **Installation on the client side should not be necessary** for the operation of the user interface.
- The appearance of the applications should adjust to the specifications contained in the "Design Manual" and practice applied by existing applications.
- If necessitated by the function of the application, it is possible to use tools other than those generally applied for the setup of the user interface on the basis of special authorisation obtained prior to the launching of implementation.
- A Help function effectively assisting users shall be implemented in the display layer in relation to interactive systems.

4.3. Business logic

- In general cases, in the absence of specific necessity and authorisation, **business logic shall be made accessible in a Web-service form**

4.4. Data storage

- In relation to databases classified on the basis of risk analysis into a high category, the application of ORACLE RDBMS is required, if RAC (Real Application Cluster) configuration where necessary.
- In relation to general purpose systems, the database manager should be chosen according to efficiency criteria on one of the available platforms
- The application of business logic directly related to data management in the data layer is permitted if it has a strong link to the given application and its general use in the future is not likely

5. Infrastructure services

5.1. Use of directory

- The **directory based services** shall be implemented in the **Windows 2008 Active Directory (AD)** environment, the AD is deemed to be the authentic source of objects.
- In relation to applications, the use of the **Active Directory Application Mode (ADAM)** is supported.

5.2. Mail, sending of notifications

- ✦ The mail system is **Microsoft Exchange Server 2003, expected to be version 2010 from H2 of 2010.**
- ✦ The sending of mail from applications is supported with SMTP (Simple Mail Transfer Protocol) or OWA (Outlook Web Access) access.

5.3. PKI

- ✦ The PKI infrastructure of the MNB must be used by internal systems, where the use of digital certification or encryption is required.
- ✦ The "Form Signing" component of the PKI infrastructure shall be used for the support of digital signing used by users at the end user work stations.

5.4. DNS

- ✦ Services operating in the MNB network must be registered in DNS, and prior to the use of a service, its availability must be determined on the basis of DNS.

6. Resource management, virtualisation

- ✦ **For the purpose of the optimal use of IT resources, the MNB applies a virtual environment.** The applications shall be capable of cooperating with the used solution. The use of physical environments is only possible with prior authorisation obtained during the planning of the system.
- ✦ The tools of virtualization are provided by the **VMware Virtual Infrastructure 4 – ESX 4 environment**

7. Workflow planning and development

- ✦ The **K2.net 2003 solution¹ based on the MS BizTalk 2006 environment** shall be used for the development of Human workflow systems.

¹ The next generation solution – BlackPearl – is scheduled to be introduced in the course of 2010

8. General security requirements

- ✦ **The authentication of users is performed as part of the Active Directory log on process;** subsequently, applications may not request certification of personal identification from the user in general cases. In relation to highly-protected systems, following a card log on, re-authentication of users is possible for the authorisation of business critical transactions through the repeated request of the PIN code belonging to the inserted card.
- ✦ **KERBEROS based authentication shall be used for the use of applications.** Authentication is performed in the course of the Active Directory log on process; the user obtains a right to request access to the applications (TGT, Ticket-Granting-Ticket). **The ticket requested for accessing applications enables their use, and the application layer can thereby access additional application layers or databases.** Each layer evaluates the legitimacy of access on the basis of the ticket issued by KERBEROS; the creation of an own authorisation system – in the absence of relevant permission – is not permitted. After the user has identified himself with the card/PIN or name/password, the applications may not request further authorisation from the user for the operating system.
- ✦ **Authorisations may only be assigned to roles;** direct authorisation is not assigned to the user either on the level of the operating system or the database. The access rights of a given person shall be ensured through the assignment of the given user to the roles. The roles are stored by the Active Directory; their management is also performed there².
- ✦ Only applications **not necessitating the setting of administrator level authorisation for the user** may be set up

9. Logging

- ✦ The system integration infrastructure performs the central logging function (NAPAD) Unless provided otherwise by a special agreement, the use of the above is required. Annex 6 contains the description of central logging

² In the absence of individual permission for this purpose, authorisation management implemented in the databases of the application is not supported

10. Data archiving

- ✦ In the course of implementing the applications, a solution shall be applied which **only stores data actually necessary for operation in the operational data storage**; data not used anymore **must be archived**.
- ✦ The size of the operational data storage may not increase above the maximum plan values, and the response times produced by the system may not exceed the planned values with the increase in data quantity
- ✦ The rollback of part or whole of archived data should be possible; rollback shall also be prepared for the management of data archived by the earlier versions of the system.

11. Delivery for operation, setup

- ✦ **Delivery for operation shall be performed according to the Audit Protocol** (Annex 4); delivery-receipt is conditional on the acceptance statement of the operator in each point contained therein.
- ✦ **The setup of an application system shall be performed in accordance with the change management regulations in force.** Annex 5 sets out the extract of the Change Management Regulations.
- ✦ The operating schedule shall be taken into account for setup, and as a general rule, **the setup may not cause a shutdown during operating time or a risk to live operation**

12. Quality issues

- ✦ All delivered documentation – including the source code – shall be clear and **legible for the customer**. The **reason for the choice of solutions** applied in the implementation of the system **and the operation of the solutions** shall be comprehensibly described
- ✦ The applications shall ensure the **freeing up of unused resources** if these are no longer necessary.

Annex 1

IT infrastructure



IT infrastructure.doc

Annex 2

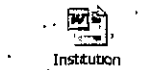
Operating schedule



Operating schedule of the IT Operations I

Annex 3

Institution Image



Institution Image.doc

W

Annex 4

Audit Protocol³ Setup and operation



Rules relating to
setup.doc

Annex 5

Change Management Regulations (extract)



Change Management
Regulations.doc

Annex 6

Central Logging (NAPAD)



NAPAD developer
documentation.doc

³ The new version of the documentation closing the development project is called the Audit Report; until this is ready, the regulations setting out the setup schedule have been attached.



Annex 1
to the IT development requirements

IT infrastructure of the
Magyar Nemzeti Bank

V2.0



Prepared: November 2009

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1. Technological-technical infrastructure

1.1. End user work stations

The minimum configuration of PCs used at the MNB centre: PIV 2GHZ processor, 1GB RAM, 17" monitor and 1280x1024 resolution, Hungarian keyboard, with mouse. The use of removable data storage at the work stations is not permitted, individual authorization is permitted with the use of Sanctuary Device Control (SDC) protection software. Access to the local disk is partly restricted with regulation by group policies. The computers are made with an image-based, automatic Business Desktop Deployment (BDD) procedure, permanent local data storage is possible only with personal responsibility of the user. The basic installation is image-based, the individual software are installed on the computers with the post installation of automated installer packages located in the MNB software library.

1.2. Printers

Jointly used network printers are in use; the use of a local printer is only possible in individual cases, following authorization. The network printers are used with the TCP/IP printing or HTTP printing protocol.

1.3. Network

Available network services:

- Ethernet local network on servers 1 Gbps, with 100 Mbps automatic configuration at work stations (corresponding to Full-Duplex setting);
- Mandatory use of TCP/IP based protocols;
- DHCP and DNS service is available with SSL support;
- Server access with use of standard protocols:
 - file server: SMB-TCP,
 - MS Exchange: SMTP content filtering,
 - Intranet – generally: HTTP:80,
 - Intranet – personal Websites: HTTP:81;
- SOAP based Web service protocol (http/soap/xml);
- RDP protocol for access to terminal type services

1.4. Reliability of service, scalability

On the server side, the MNB enables the desired availability and scalability – if justified by demand – through the clustering of server computers (active-active, active-passive, use of NLB clusters)

For the purpose of efficiently managing server capacities, the systems – in the absence of specific authorization – shall be realised in a virtual environment operating in a VMware Virtual Infrastructure 4 environment.

1.5. Physical data storage

Data is stored in central, fault-tolerant data storage, data paths between the servers and data storage is duplicated, data areas are reflected to the remote data centre.

1.6. User authorization, authorization model

The authorization of users is performed through the client side operating system, the applications request user authorization from the operating system. In practice this means the use of Active Directory integrated systems.

The authorization model shall be based on roles.

In operations that are sensitive from a security point of view, such as systems based on business processes, the use of digital signatures based on the Public Key Infrastructure is required for the purpose of stronger authorization of users and provability.

1.7. Application interface, security

The Intel servers are monitored by the NAGIOS application and its add-ons. The remote installation and subsequent monitoring of the work stations is performed by the System Center Configuration Manager (SCCM) and the Windows Server Update Services (WSUS) support the installation of the operating system and the service packages of Microsoft Office components, security updates. Virus protection is provided by the monitoring application of TrendMicro OfficeScan. Content filtering is provided by proxy based ClearSwift (CS) products: CS WEB Appliance – for HTTP access, CS Scp – for HTTPS access and CS for SMTP for electronic mail.

2. Operating systems

2.1. End user work stations

Windows XP Professional SP3 (English, 32-bit) operating system, continuously updated with service packages in accordance with the security and management standards of the MNB, configured with group policies

Other operating systems are subject to an individual authorization procedure (including the 64-bit version of Windows XP).

2.2. Intel based servers

Windows Server 2003 R2 and Windows Server 2008 R2 (English, 64-bit) operating system, continuously updated with service packages in accordance with the security and management standards of the MNB, configured with group policies.

2.3. UNIX servers

IBM AIX 5.3 in VIBER environment and SUN Solaris 10 in REUTERS environment.

Other applications in these environments may only be installed after individual authorization.

3. Application systems, software components

3.1. End user work stations

Operating system

- Windows XP Professional SP3

Operating system support programs

- Remote Desktop Connection 6.0.6001
- Internet Explorer 7.0
- Microsoft .NET Framework 1.1 SP1
- Microsoft .NET Framework 2.0 SP2
- Microsoft .NET Framework 3.0 SP2
- Microsoft .NET Framework 3.5 SP1
- ActivCard AcuvClient 6.1 SP2
- Windows Installer 3.1

- Windows Media Player 11
- Adobe Flash Player 10
- Adobe ShockWave Player 11.5
- Java SE Runtime Environment 6.0 Update 7
- Microsoft Silver Light 2.0
- Microsoft Visual C++ 2005 Redistributable

3.2. Office applications

- Office Professional Plus 2007 SP2 (English) + Multilingual User Interface – MS Office Language Pack, with default Hungarian but changeable language settings.
- Microsoft Office Proofing Tools Kit 2007.(12 0 4518.1070)
- Microsoft Visio Viewer 2007
- Microsoft Office 2007 Primary InterOp Assemblies
- Microsoft Office 2003 Web Components,
- Personal Web Access Service Pack for MS Project Server 2003,
- Adobe Acrobat Reader 9.1.0
- WinZip 9.0

Additional image-based applications

- Centura Runtime 1.1.9,
- SPT fonts,
- SAP GUI 7.10
- Oracle 7 (Release.7.3.4),
- SQL Net Client 2.3.2.1.0,
- MonDoc Client 2.0.5.0035
- MS Network ScanGear 2.2
- HP Open View Service Desk Client 5.10.112
- AB.DigitSign 2.0
- Audata 2007 (software inventory application)

3.3. Public Key Infrastructure

Smartcard login (Windows XP / Windows 2000) is performed through the Windows 2000 Kerberos service, with private key stored on smartcard device and X.509 certificate. All users have certificates necessary for login and digital signatures, certificate necessary for encryption, code-signing and remote work may be separately requested.

3.4. Intel based servers

- MS Windows 2003 PKI CA, built on Windows 2003 Active Directory schema,
- MS Exchange 2003 Server,
- MS Internet Information Server 6.0,
- MS Sharepoint Portal Server 2003,
- MS BizTalk Server 2006 Standard Edition,
- MS Reporting Services SP1,
- IIP Open View Service Desk 5.1

3.5. Other server tools

- Janus Web ASP.NET Server Controls Suite V1.5
- Janus WinForms Controls Suite V2.0

3.6. Database managers

- Microsoft SQL*Server continuously updated with 2005 and 2008 database management service packages, default "Standard Edition", use of "Enterprise Edition" is possible after prior arrangement;
- Oracle RDBMS 10g R2 database manager, default "Standard Edition"; "Enterprise Edition" is possible with Real Application Cluster option, where necessary, after prior arrangement.

3.7. Miscellaneous

Internet access through ISA 2004 (Internet Security and Acceleration Server) solution filtered from authorized – non-business-critical, work station – zones.

**Technological procedure No. 2/2009
on the operating schedule of the IT Operations Division**

Effective date: 1 April 2009
 Issuer: Head of IT Services
 Prepared by: IT Services
 Administrator: Béla Dékány

Approved by Gyula Pap [signed by hand]
 Head of IT Services

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I Reference

The purpose of this procedure is to set out the work schedule of the IT Operations Division

II Related orders

- Collective Agreement of the Magyar Nemzeti Bank,
- 2008-547 organisation unit executive order on rules relating to work time records and data provision.

III Scope

The **personal scope** of the technological procedure extends to employees performing duties at the IT Operations Division of the IT Services organisation unit.

IV Operative section

The IT Operations Division supports the operation of the systems with *on-site presence* on business days 07:00 a.m. – 5 p.m.

IV. 1. IT Infrastructure Operations Group

1. Work schedule

With respect to the **WINDOWS systems engineers**, the morning work time extends from 07:00 a.m. to 3:30 p.m. on business days and from 08:30 a.m. to 5:00 p.m. in the afternoon on business days. The stand-by service performs duties from 5:00 p.m. to 7:00 a.m. on business days and from 7:00 a.m. to 7:00 a.m. on holidays (24 hours).

With respect to the **ITSec systems engineers**, the morning work time extends from 07:00 a.m. to 3:30 p.m. on business days and from 08:30 a.m. to 5:00 p.m. in the afternoon on business days. The stand-by service performs duties from 5:00 p.m. to 7:00 a.m. on business days and from 7:00 a.m. to 7:00 a.m. on holidays (24 hours).

The stand-by staff shall commence the correction of the error – if it affects critical systems – within 30 minutes from the alert launched by the Monitoring Centre or the monitoring systems with a remote login. If the correction of the error is not possible by remote methods, the stand-by staff shall promptly appear at the Bank and commence measures aiming at the correction of the incident.

With respect to the **UNIX systems engineers**, the morning work time extends from 07:00 a.m. to 3:30 p.m. on business days and from 08:30 a.m. to 5:00 p.m. in the afternoon on business days.

Staff who do not perform morning, afternoon or stand-by duties shall fulfil total, statutory work time in the average of two months' work time (two months' work time framework) of the varying work times of the particular work days, adjusted to the core time (09:00 a.m. – 3:00 p.m.).

2. Notification rules

Morning staff shall send SMS notification on the commencement of work to stand-by staff; he may then depart from the stand-by location to the Bank. Having arrived at the stand-by location, the stand-by staff shall notify by SMS the afternoon staff that he will commence stand-by service from 5:00 p.m. In case of omission of notifications, the systems engineer on duty may not leave his location.

If the above work schedule cannot be fulfilled due to understaffing, the notification rules may be disregarded. The afternoon service may be omitted if the stand-by service set out above is ensured. If stand-by and morning duty is performed by the same person, morning duty shall be commenced at the time specified above.

IV. 2. Application Operations Group

With respect to the Application Operations Group, the morning work time extends from 07:00 a.m. to 3:30 p.m. on business days and from 08:30 a.m. to 5:00 p.m. in the afternoon on business days.

In relation to the VIBER and INFORIX systems, the on-site presence of the system administrator is essential until the running of the Housekeeping task of the VIBER closing procedure. In case of problem free operation, other tasks may be controlled by operator monitoring. Occurring errors or problems may be managed by notification of the system administrators involved by the operators. If the system administrator and the operator are unable to correct the error by phone communication, the system administrator shall go to the Bank with the tax checks made available to him or by other means and correct the error. If UNIX systems engineer authorisation is required to correct the error,

- a. the system administrator shall provide access to the appropriate administrator passwords, or
- b. the UNIX system administrator must also go to the Bank.

Staff who do not perform morning or afternoon duties shall fulfil total, statutory work time in the average of two months' work time (two months' work time framework) of the varying work times of the particular work days, adjusted to the core time (09:00 a.m. – 3:00 p.m.).

IV. 3. User Support Group

With respect to the User Support Group, the morning work time extends from 07:00 a.m. to 3:30 p.m. on business days and from 08:30 a.m. to 5:00 p.m. in the afternoon on business days.

Staff who do not perform morning or afternoon duties shall fulfil total, statutory work time in the average of two months' work time (two months' work time framework) of the varying work times of the particular work days, adjusted to the core time (09:00 a.m. – 3:00 p.m.).

IV. 4. Monitoring Centre

The work schedule of employees working in operator positions. In three shifts, alternating 3x8 hour work times on business days

Morning 6:00 a.m. – 2:00 p.m.

Afternoon 2:00 p.m. – 10:00 p.m.

Night 10:00 p.m. – 6:00 a.m.

The User Support Group shall switch the HELPDESK phone numbers known by the users to the Monitoring Centre after 5:00 p.m. Operators can also access HELPDESK mail. Their tasks are expanded with the receiving of calls after 5:00 p.m., with notification of persons concerned in critical cases and the recording of cases received by phone and e-mail.

IV. 5. Setup of monthly work schedule

The work schedule is in a monthly breakdown and it shall be set up no later than five business days prior to the relevant month. The group heads of the IT Operations Division shall approve the work schedule with respect to their own groups. The approved work schedule may be subsequently modified only by authorisation by the group heads. The work schedule shall be published on the Knowledge Base and Information Portal.

V. Closing provisions

The technological procedure hereunder shall go into force on 1 April 2009 and remain in force until revoked. It shall simultaneously override technological procedure No. 2/2008 on the work schedule of the IT Operations Division.



INTRODUCTION

This section (Web Design) of the MNB Design Manual defines the formal framework of the web communication, Internet, intranet and online communications used by the MNB.

The website of the Magyar Nemzeti Bank (hereinafter "MNB") serves as a relevant source of information for the international and national press and the public. The MNB intranet is a key internal communications solution. Both media are used in everyday operations; information published on these sites represents an enormous, continuously expanded cluster. It is therefore extremely important that the information - containing continuously changing content - is displayed with uniform design elements for the thousands of visitors a day.

The rules set out hereunder aim at providing mandatory directives to ensure that the appearance of the MNB Internet and intranet sites is uniform at all times, in all environments and to support the set communications objectives.

In the process of defining the basic elements of the intranet and Internet design, we took into account the varying functionality and communication aims of the intranet and Internet. The Internet basically functions as a communications tool, therefore it must comply with formal design requirements. In the case of the intranet, however, different functional usage is possible which requires a different approach in terms of design and formal criteria.

For the purpose of regulating the above, we define two different formal levels

Formal

Content published on this level must at all times comply with design regulations.

No deviation from regulations is permitted

The Internet sites, publications must in all cases be on the formal design level.

The intranet main page, the headers, menu rows (columns) of the department main pages and pages displaying the internal regulations of the MNB (e.g. managing director, governor orders) are deemed to be intranet formal page sections.

Informal

The informal intranet design level requires a uniform design image, but allows variation from formal requirements, provided that the design remains uniform and consistent. The independent Internal Communications Department is responsible for the authorisation of variation from the web design regulations, the design and maintenance of the pages

Attention! The image material, texts contained in the web design regulations are in all cases illustrations and not approved design requirements!

The redesign of web interfaces not compliant with current regulations must be commenced concurrently with the publication of the design regulations. Interfaces not compliant with regulations may not be used after 15 February 2005!

(Web design designed by SmartWorks/Axelero.)



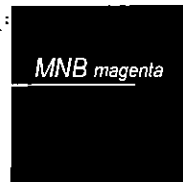
GENERAL GRAPHICS DIRECTIVES

Colour concept

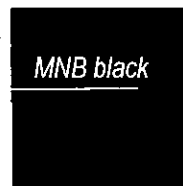
RGB basic colours used on the web communications interfaces of the MNB.



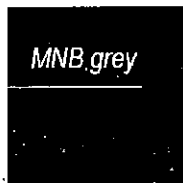
RGB gamut
Red . 0
Green . 75
Blue . 20
Hexa #004B14



RGB gamut
Red . 115
Green . 0
Blue . 0
Hexa #730000



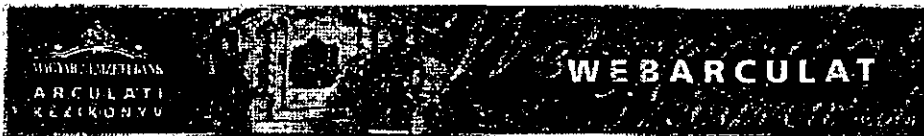
RGB gamut
Red . 0
Green . 0
Blue . 0
Hexa #000000



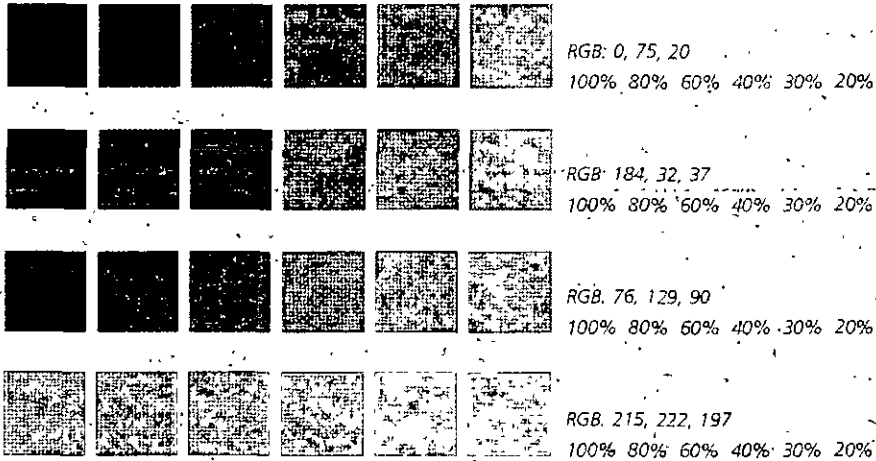
RGB gamut
Red . 100
Green . 100
Blue . 100
Hexa #646464

Stringent regulations relating to the use of colours.

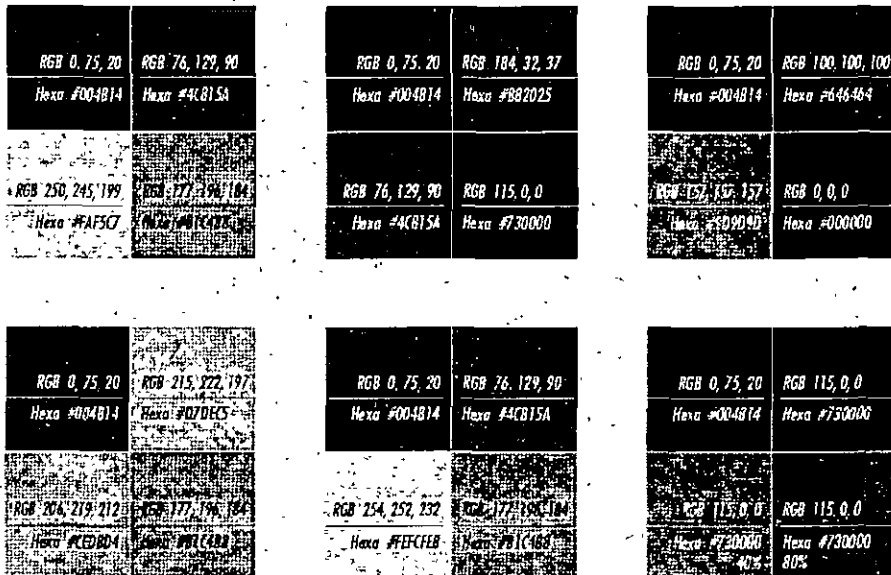
- green is the dominating colour for the use of static image elements (e.g. header),
- monotone images may only be displayed in the colour green,
- magenta is a complementary colour and is primarily related to active content (links, menu items),
- static, content elements (textual content) are in the colour black and grey.



Complementary colours



Example of the combined use of colours



Permitted fonts

When selecting families, the primary criterion is that fonts included in the design should also express the stature, gravity of the printed design elements of the MNB on the web communications interfaces, being suitable for the execution of all web tasks in a "platform independent" form, but allowing sufficient room for the aesthetic expression of graphical, visual ideas

In accordance with the above, the main font family used on such interfaces of the MNB are the grotesque Verdana, while Helvetica and Garamond used as complementary font families in image elements.

Verdana – grotesque font

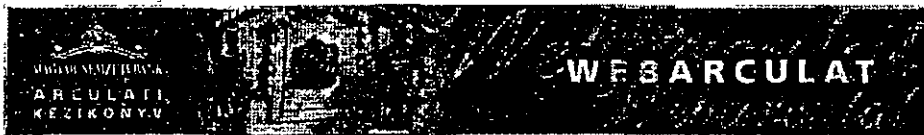
Verdana normal abcdefghijklmnop nopqrstuvwxyz ABCDEFGHIJKLM NOPQRSTUVWXYZ 1234567890 # & @ . , : ! ?	Verdana bold abcdefghijklmnop nopqrstuvwxyz ABCDEFGHIJKLM NOPQRSTUVWXYZ 1234567890 # & @ . , : ! ?	Verdana italic abcdefghijklmnop nopqrstuvwxyz ABCDEFGHIJKLM NOPQRSTUVWXYZ 1234567890 # & @ . , : ! ?
--	--	--

Garamond – antiqua font

Garamond abcdefghijklmnop nopqrstuvwxyz ABCDEFGHIJKLM NOPQRSTUVWXYZ 1234567890 # & @ . , : ! ?	Garamond bold abcdefghijklmnop nopqrstuvwxyz ABCDEFGHIJKLM NOPQRSTUVWXYZ 1234567890 # & @ . , : ! ?	Garamond italic abcdefghijklmnop nopqrstuvwxyz ABCDEFGHIJKLM NOPQRSTUVWXYZ 1234567890 # & @ . , : ! ?
--	---	---

Helvetica – grotesque font

Helvetica abcdefghijklmnop nopqrstuvwxyz ABCDEFGHIJKLM NOPQRSTUVWXYZ 1234567890 # & @ . , : ! ?	Helvetica bold abcdefghijklmnop nopqrstuvwxyz ABCDEFGHIJKLM NOPQRSTUVWXYZ 1234567890 # & @ . , : ! ?	Helvetica italic abcdefghijklmnop nopqrstuvwxyz ABCDEFGHIJKLM NOPQRSTUVWXYZ 1234567890 # & @ . , : ! ?
---	--	--

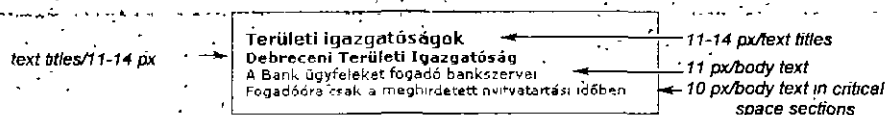


Colour and size of fonts

Fonts of texts in text format

Verdana type fonts may be used as text title, separator and body text in a normal, underlined and bold form in text format on the MNB pages

Size of fonts



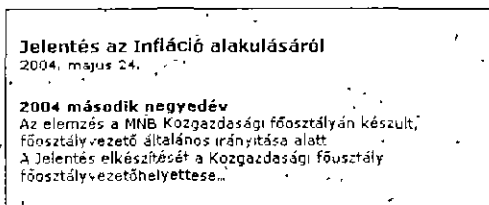
The size and colour of fonts must be used consistently. The use of CSS style sheets is mandatory in all cases!

Colour of texts in text format

The body text should always be displayed as dark on a light base; its own colour should preferably be black or dark grey

The active status of links is indicated by underlining or the saturation of the link's colour (magenta-red, green-light green primary colours).

Text highlighting	Verdana – underlined and/or bold – grey, black
Text title	Verdana – bold – black, green, magenta
Link	Verdana – bold and/or underlined – green



The text colour is always white on a dark coloured column and background.

The size and colour of fonts must be used consistently on all pages. The use of CSS style sheets is mandatory in all cases!



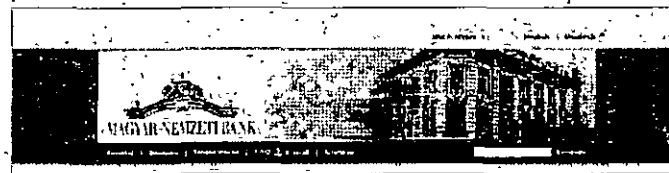
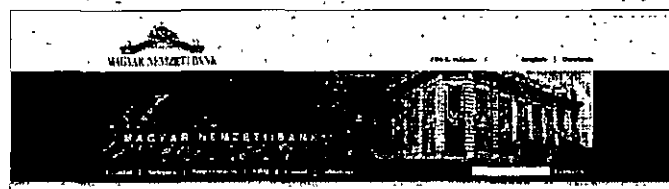
Size and colour of the fonts of image elements

A Helvetica or Garamond font must be used for graphical captions

The size of fonts is 10-36 px (graphical titles, subtitles, menu items)

Font colours are in all cases white on a dark background and green, grey or black on a white background

The ShelleyVolante font is used for possible complementary texts displayed as a background print. The font size is minimum 70 px for background prints



The size and colour use of fonts must be consistent on all pages.

Use of images

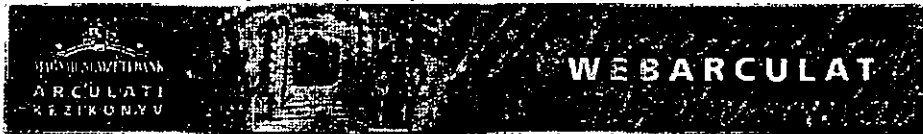
The images used on the pages fulfil an information and display function. The font and colour accuracy rules set out in the chapters "Colour Concept", "Used Fonts" and "Colour and Size of Fonts" apply to images fulfilling an information function (e.g. explanatory or flowcharts, organisation charts)

The images with a display function, fulfilling aesthetic and navigation tasks, are in compliance with the design regulations if these (are) preferably:

- adjust aesthetically to the design of the pages,
- general image illustrations comprehensible by all viewers,
- comply with the MNB communications standards.

Image formats

The applied graphical elements must be in GIF or JPG format, with a uniform resolution of 72 dpi, RGB colour code. In relation to images in a colour GIF format, colour compression is "adaptive", the image quality must be at least medium in relation to the JPG format.



Colour and display of images

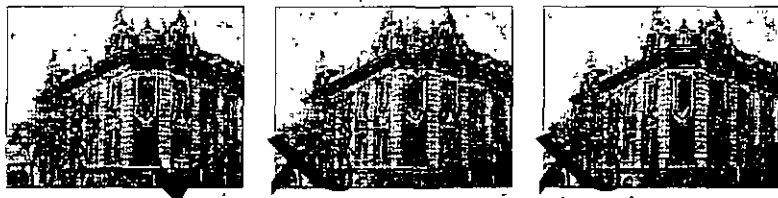
The images used on the Internet pages of the MNB should be in colour



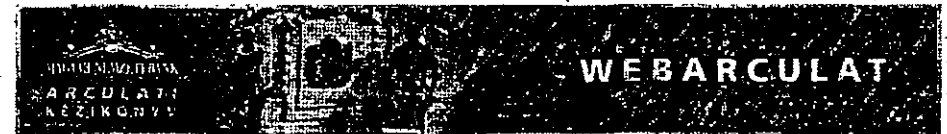
The use of black and white images is only permitted in special cases (e.g. press material, black and white creative approach in promotional material)



Monotone images may only be displayed in the colour green,



The images must be of good (near photograph) quality, with contrast, sharpness and good saturation.



The use of image detail (in which image content is damaged, cropped, etc.), blurred or inaccurately coloured images must be strictly avoided.

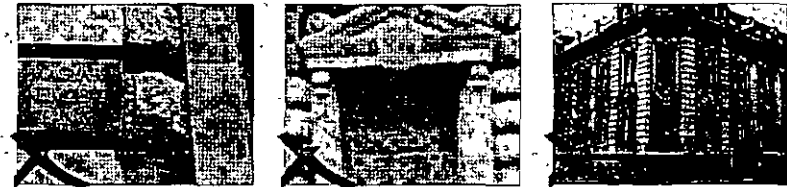


Image file size

Internet

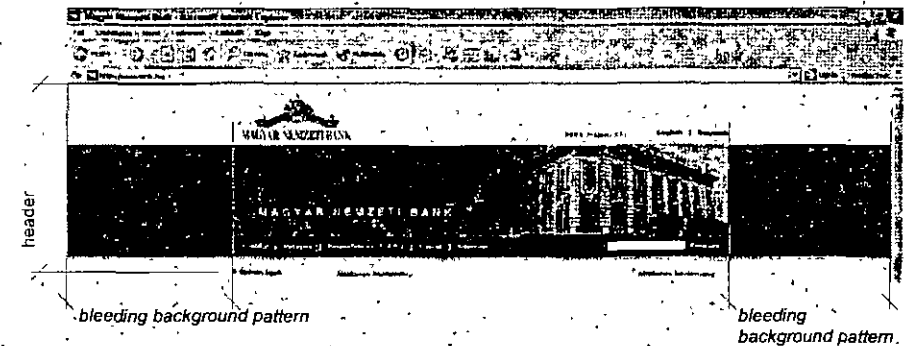
For the purpose of the fast display (loading) of pages the maximum file size of images used on the Internet pages of the MNB is 40 kB (kilobyte) per image. Images used as main graphical elements (e.g. header) may comprise an exception if their quality is definitely bad under a 40 kB file size.

Intranet

In relation to the intranet, the maximum file size of images used on the pages is 150 kB (kilobyte) per image, but the total size of images displayed on a page may not exceed 1500 kB

Background

The background of images must be uniform. The background of the home page – if justified by the creative design – may vary from the uniform background of the internal pages. With the exception of the header, the page should preferably not use background images. The colour of the background is in all cases white. The use of a solid background pattern is permitted in and at the height of the header; when used, the pattern runs to the edge of the screen.

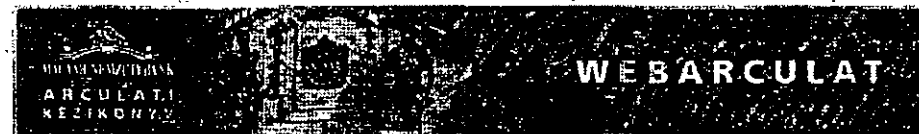




Prohibitions

It is prohibited to deviate from the given graphical directives!

Only the specified colours, colour codes and fonts may be used, notwithstanding that differences may appear under identical settings in computer configurations of various types and brands.



PAGE STRUCTURING AND STRUCTURAL EDITING RULES

Technological rules

In certain development specifications, technological rules need to be observed such as screen resolution, page size and applicable technologies. Sounds are not used on the formal pages of the MNB, only for presentation purposes or on microsites, if these serve conformity with communications principles.

Screen resolution

Internet

In the creative image design process, the primary criterion is that the pages must be viewable in their total width with the given screen resolution, where a horizontal scroll bar does not appear in the browser.

Therefore – on the basis of current user statistics – the design screen resolution is 800x600 pixels.

The design screen resolution may be modified in the future with MNB standardisation relating to IT screen resolution and changing user habits.

Intranet

The design screen resolution corresponds to the value defined for the standard work environment of the MNB. (Currently this value is 1024x768 pixels, with 32 bit colour depth.)

In the course of image design, it should be noted that content should also be displayable with scroll bars in a resolution one step below the default resolution (currently 800x600 pixels).

Spatial positioning of pages

The structure and size of the page is adjusted to the design screen resolution and does not change in case of another resolution. With a higher resolution, the content section of the page is aligned to the left or the centre. With pages aligned to the centre, a white margin is displayed on the right and left sides.

The entire page can be scrolled, with a default setting, all major navigation elements must be visible.

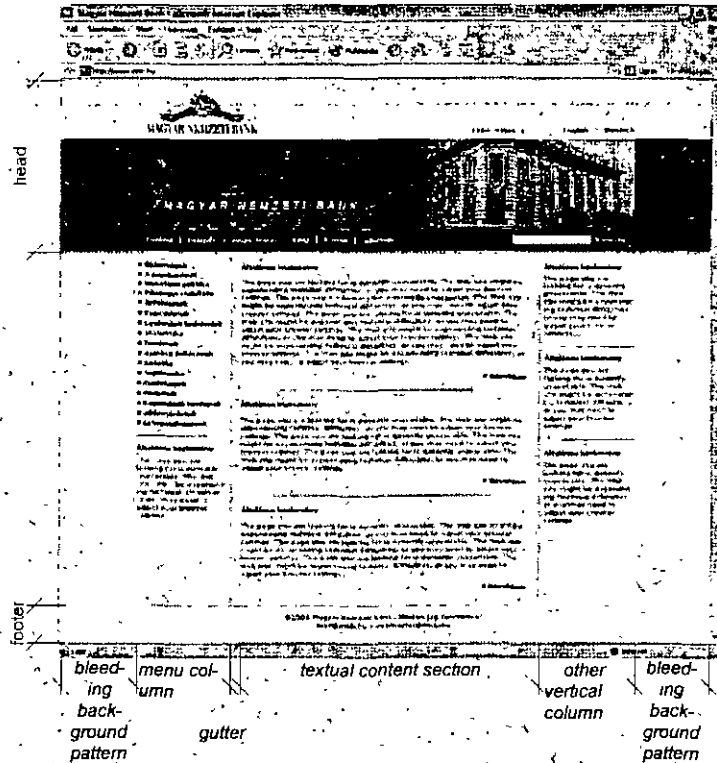
W



Structural elements of pages

The page is composed of the following main structural elements:

- header
- menu column
- textual content section
- other vertical column
- footer

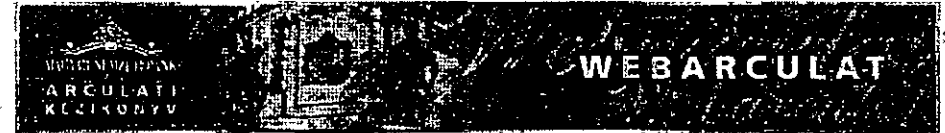


Recommended column ratios

The vertical layout of the menu column and the textual content section is based on the different grouping of 1/5 sections of the page. E.g. 1/5 – 3/5 – 1/5 or 1/5 – 4/5. The textual content section may be divided into further columns, depending on the number of 1/5 sections it is composed of. E.g. with a 1/5 – 4/5 division, the 4/5 main content section may be further divided into two 2/5 sections.

The menu columns and the textual content section must in all cases be clearly separated from each other (e.g. different menu background or use of rules). Graphical elements should preferably not be used for the separation of columns within the textual content section.

The distance between the menu column and the textual content section is minimum 30 pixels. The distance between the individual columns of the content section is minimum 15 pixels.



Requirements related to the download size of pages

Internet

For the purpose of fast downloading, the maximum size of the MNB Internet main page is 250 kB; the maximum size of internal pages may be 180 kB. The size of other applications, downloadable documents on the page is not maximised, but their size needs to be indicated for information purposes, e.g. "PDF (330 kB)".

Intranet

For the purpose of fast downloading, the maximum size of MNB intranet pages is 1800 kB. The size of other applications, downloadable documents on the page is not maximised, but their size needs to be indicated for information purposes, e.g. "PDF (1400 kB)".

Prohibitions

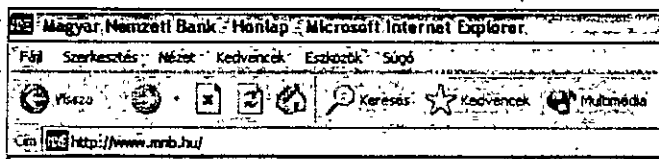
No deviation whatsoever is permitted from the page structuring regulations defined in the chapters of the "Page structuring and structural, editing rules".



HEADER

Browser title

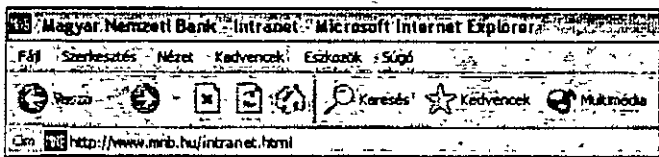
The use of the <TITLE> HTML TAG containing the title is recommended on each page, as follows: Internet home page: <TITLE>Magyar Nemzeti Bank – Website</TITLE>



title tag on the Internet home page

Intranet home page:

<TITLE>Magyar Nemzeti Bank – Intranet</TITLE>



title tag on the intranet home page

Use of the emblem

The simplified emblem of the MNB or its version on a dark base is a mandatory element in the header of the MNB pages.



Attention: the simplified emblem on a dark base does not correspond to the inverse version of the simplified emblem!

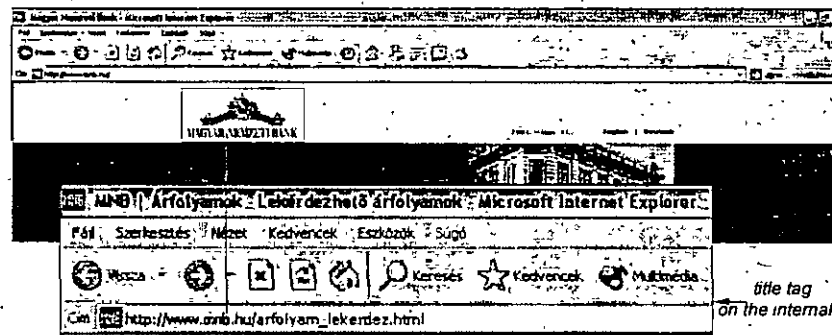


The following regulations apply to the simplified emblem used in the area of the header or in header graphics or its version on a dark base:

- the simplified emblem must be displayed with a minimum 170 pixel width,
- the simplified emblem must be placed at a minimum 15 pixel distance from the upper edge of the screen; the mandatory empty area around its other sides must be minimum 9 pixels.
- Internet: the simplified emblem used in the header must in all cases function as a link and point to the home page of the MNB Internet website,
- intranet: the simplified emblem used in the header must in all cases function as a link and point to the home page of the MNB intranet site.

Recommended positioning:

- it is recommended to position the emblem to the left of the page or the left side column



title tag on the internal pages

emblem above the header

Header graphics

The header extends to the edge of the page in all resolutions

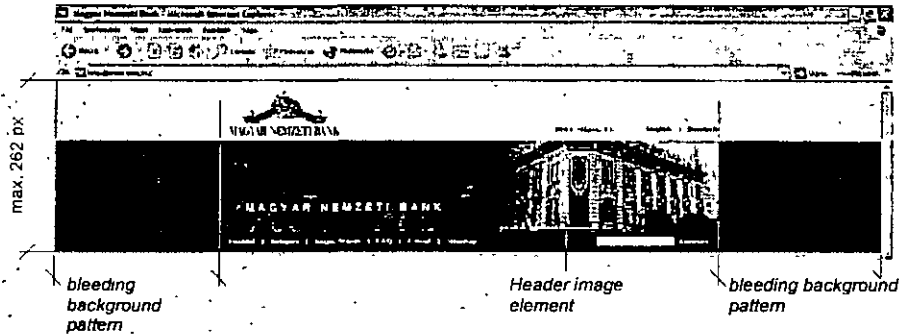
The images of the header should be displayed in monotone green; in all cases they are aligned to the right and blend with the background on the left side.

The image element used in the header – related to the topic of the given page – aligns on the bottom, top and right to the header and covers at least 30 per cent and maximum 50 per cent of its space. The images must in all cases make clear reference to the content of the given topic.

The header must be displayed in the same size and spatial position on each page!



The total height of the header may not exceed 262 pixels!



FORMAL CRITERIA OF TEXTUAL CONTENT

Quantity of textual content

For the purpose of displaying clear content on the MNB pages, the quantity of textual content on a page may not exceed 1,200 words or 10,000 characters.

For the purpose of clarity on the pages, with an 800x600 pixel screen resolution it is recommended to maximise textual content at 6 screen pages. (This corresponds to approximately a 3000 pixel "page height".)

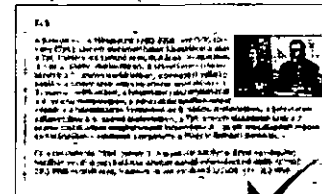
In relation to longer content, it is necessary to divide the page into several partial pages; the rules applicable to the individual pages apply to such partial pages.

Structuring rules

The legibility of page content principally depends on the layout of the text

As a result, the following directives apply to the editing of textual content:

- for the purpose of improved clarity, a long flowing text with over 10 lines must be divided into paragraphs, in parallel with the structuring of textual meaning,
- the individual paragraphs may be given their own titles (e.g. underlined, with the font type used at the given place).



Fragmentation criteria

Fragmentation and column setting must in all cases support easy navigation and clarity. The fragmentation of texts must always be aligned left or even. Elements with different content or logic must also vary from each other visually and in layout. The use of horizontal rules is recommended for the layout of elements.

In the editing process of pages, the page structuring rules and page sizes must be fully observed.



Use of images in page content

In the course of using images, rules relating to permitted image formats, colours, sizes must be observed, no deviation from these is permitted.

Directives relating to the use of images inserted in textual content:

- the total width of images used in one column may not exceed the width of the given column,
- if the size of the image exceeds the size of the column, the reduced version of the image must be used which, if clicked, may appear in original size in the pop-up window,
- if the image is displayed not in itself, but as an illustration, the height of the image used in the textual content may not exceed the height of the text displayed in the given column,
- a text paragraph (with approximately 10 lines) may contain maximum 1 image,
- the images are displayed with a solid 1 px wide grey (#646464) frame.

definition of images with a solid frame on the style sheet (CSS):

```
img.pic { border: 1px solid #646464, }
```

use in HTML code:

```

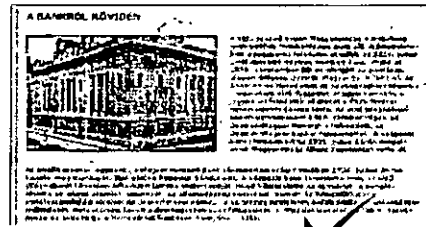
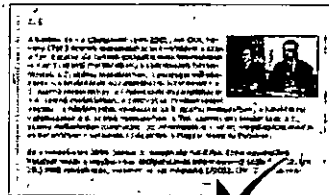
```

in the flowing text, images must be kept horizontally and vertically at 5 pixels distance from the text, respectively, on all sides

the 5px distance with HTML elements is possible in the following manner:

```

```



Use of tables in page content

The width of tables may not exceed the width of the column of the textual content section.

The background colour of the cells may not vary from the background colours used in the design

The colours of the table and cell borders may be colours required by the design manual for graphics and text.

The rules applicable to the design also apply to text used in the table, and in addition, the text inside the cells must be at least 3 px from the border around the cell

Pénznem	Egyesítő	Deviza	Pénznem	Egyesítő	Deviza
AUD	1	145,37	JPY	100	138,55
CAD	1	155,08	NOK	1	30,48
CHF	1	157,74	NZD	1	35,21
CZK	1	7,59	SEK	1	22,64
DEM	1	16,49	SGD	1	16,52
EUR	1	100,00	USD	1	120,75
GBP	1	20,47			

Pénznem	Rövidítés	Deviza	Pénznem	Egyesítő	Deviza
AUD	1	145,37	JPY	100	138,55
CAD	1	155,08	NOK	1	30,48
CHF	1	157,74	NZD	1	35,21
CZK	1	7,59	SEK	1	22,64
DEM	1	16,49	SGD	1	16,52
EUR	1	100,00	USD	1	120,75
GBP	1	20,47			

Input fields and menu selectors (forms)

The colours of the areas bordering the input field and menu selector correspond to the possible colours required for backgrounds by the web design manual. The background is always of one colour and it may not contain graphics, images composed of many colours, hues. The background colour of the input fields is always white and the characters are black or grey.

Pop-up windows

The use of pop-up windows on the MNB pages should be avoided, but it is permitted in special cases.

The use of pop-up windows is permitted:

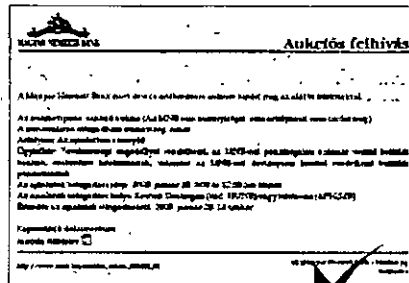
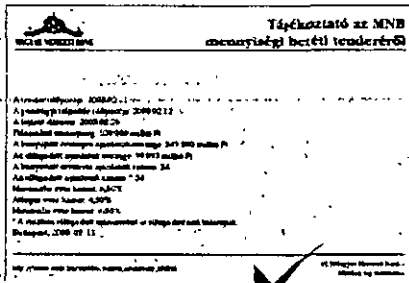
- where the printable version of the page is requested,
- in case of enlargeable image illustrations (by clicking on the image on the page, the enlarged image is displayed in a pop-up window),
- in case of tables, where the width does not conform to the design regulations,
- in other cases, when the displayable content cannot be fragmented into the textual content section without breaking the structure and uniformity of the page.

W



The colours permitted in relation to pop-up windows correspond to colours required for design backgrounds

The fonts used in connection with pop-up windows may vary (e.g. for the printed version of the page) from the fonts required according to the web design manual



Prohibitions

Deviation from the formal regulations defined in the chapter "Formal criteria of textual content" is permitted only if the independent Communications Department responsible for formal regulations expressly requests this.



FOOTER

Use of footer

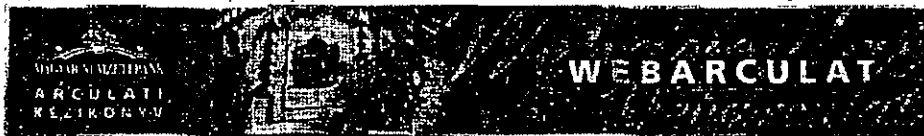
The use of the footer is recommended but not compulsory

Where used, its total height must not exceed 40 pixels, adjust to the page structure and be displayed on each page in the same size and spatial position.

The positioning of the footer must adjust to the page structure, the positioning of the header and other elements, and it must adjust to the website design in terms of both formal and image criteria; it may not disrupt the uniform design



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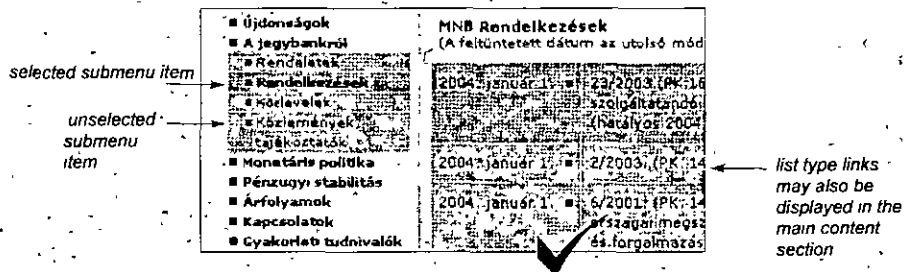
DISPLAY OF NAVIGATION ON THE MNB PAGES

Navigation requirements

- by opening any page of the website, the user finds the main menu system on the initial screen, without having to use the scroll bar ("where is the menu?"),
- the user is provided a clear overview of content on the page with the help of the menu system ("what can I find here?"),
- the user can access the content in a clearly laid out way ("how can I access it?"),
- the main, submenus and menus supporting service navigation should be clearly distinguishable on the screen: on all screens the user should be able to determine precisely where he is browsing ("where am I?").

As a practical means of meeting the above requirement of clarity, for the purpose of clear navigation, we must always indicate to the user which menu item he is visiting with colour or other highlighting.

A horizontal or vertical menu separating content sections may only be used in the header or the menu columns. In certain cases list type links may also be displayed in the main content section, e.g. article titles, related links



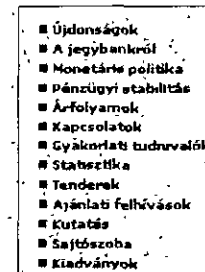
Main menu configuration requirements

In terms of design, in relation to positioning on the page, the navigating main menu is set up on the MNB website at a permanent, dominant place and position. When designing the menu, regulations relating to the setup of the page structure, the fonts and colours of the menu and the menu items must be observed.

Recommended positioning of the main menu:

- Lower 1/3 of the HEADER, adjusted from the bottom at minimum 12 pixel height,
- LEFT side column adjusted from the top

positioning of main menu
in left side column



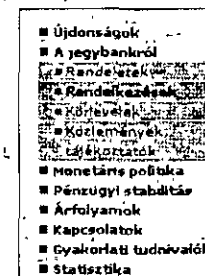
Submenu configuration requirements

The submenu – i.e. a new menu level opened from the main menu – should be distinguishable from the main menu and the content thereof in a clearly visible form (with colour, or in space or combination of the two), where the regulations relating to the use of fonts and formal criteria are observed

Recommended positioning of submenu.

- Lower 1/3 of the HEADER, adjusted from the bottom at minimum 10 pixel height,
- LEFT side column, among, next to or below the main menu elements

positioning of submenu
among main menu
elements





Positioning of service navigation

Service navigation enables the user to navigate in the most simple and direct way through the basic settings and basic services provided by the page.

Such services: site map, keyword search, language selection, etc.

The positioning of menu items pointing to these services is not bound to rules.

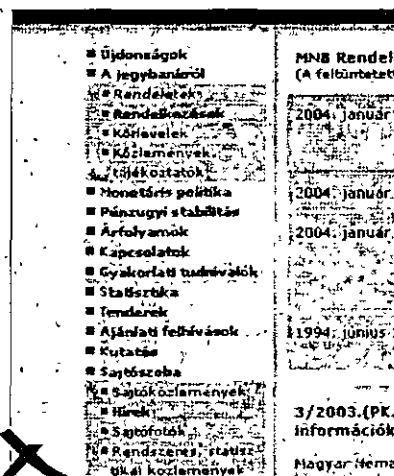
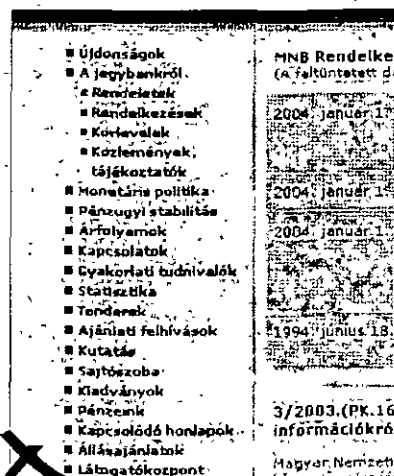
Main directives related to the positioning of menu items pointing to the services:

- clearly distinguishable from other content elements on the page,
- accessibility for the user at the same place and in the same form on all pages.



Prohibitions

The examples below show incorrectly applied navigation



DISPLAY ON INTERNET MEDIA INTERFACES

Use of the emblem

In case of display on an MNB Internet media interface, the use of the MNB emblem is compulsory on the media interface. The emblem may only be displayed on a monochrome white background; the dark based version of the emblem may only be displayed on a monochrome green background.



Attention: the basic emblem on a dark base does not correspond to the inverse version of the basic emblem!

If the basic emblem is larger than 531x219 pixels, the basic emblem must be used, if it is smaller, the simplified emblem must be used. On a media interface of landscape format, the emblem aligns to the left side of the interface, while aligning to the top of the interface in relation to an interface of portrait format.

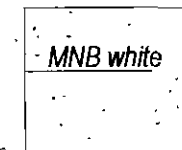
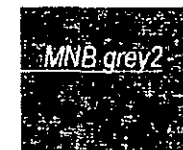
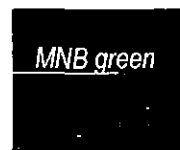
Minimum displayable emblem size:

- height: minimum 70 px

The proportions of the emblem may not change!

Use of colour

Primary colours used for display on internet media interfaces:



RGB gamut
Red 0
Green 75
Blue 20
Hexa #004B14

RGB gamut
Red 100
Green 100
Blue 100
Hexa - #646464

RGB gamut
Red 127
Green 127
Blue 127
Hexa #808080

RGB gamut
Red 255
Green 255
Blue 255
Hexa #FFFFFF



Use of fonts

Verdana (normal, bold) is the font used on media interfaces in text format

Garamond (normal, bold, italic) is the font used for captions. The colour of the fonts may be grey on a light background and white on a dark background.

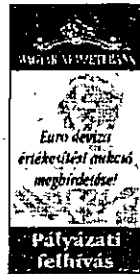
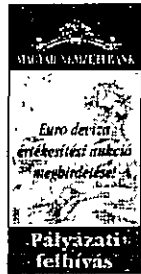
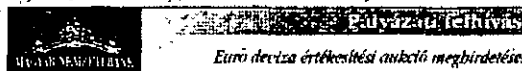
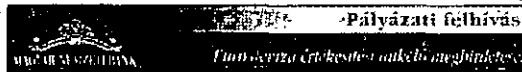
Use of background

The backgrounds used on the Internet media interfaces:

- monochrome green,
- monochrome white,
- emblem detail displayed as background print in light green on green base,
- emblem detail displayed as background print in light grey on white base,
- white-grey or white-green colour gradient

Several different backgrounds may be displayed on one interface, but no more than three

Examples of display on Internet media interfaces



APPEARANCE ON THE SITES OF PARTNER INSTITUTIONS

In relation to appearance on the websites of partner institutions, depending on the proportions and sizes of the interface, the following graphics are used:

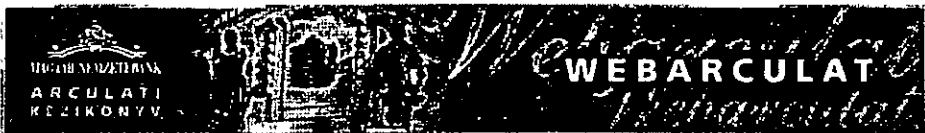


Dark graphics are used on a light base, and light graphics on a dark base.

The graphics must function as a link in all cases and point to the home page of the MNB. When clicking, the home page of the MNB must always open in a new window.

HTML example:

```
<a href=http://www.mnb.hu target="_blank"></a>
```



APPLICABLE TECHNOLOGIES

Internet

When defining the program languages applicable on the Internet pages, two important criteria must be observed:

- the browsing of the pages should be enabled for a maximum number of users, where the functions, services, visual elements designed on the pages are displayed without error,
- developers are provided the technological possibilities with which the functions, services, visual elements designed on the pages may be realised with state of the art methods

As a result of the above two criteria's optimisation, the recommended program languages:

- HTML versions 4.00-4.01
- JavaScript version 1.3

The JavaScript 1.3 script language is correctly interpreted by Netscape Navigator version 4.5 and above and Internet Explorer version 5.0 and above.

In 2004, less than 4 per cent of users use browser programs of versions earlier than the above browser versions.

Year of browser program versions and their JavaScript compatibility:

Browser	Year	JavaScript version
Netscape Navigator 2.0	1995	JavaScript 1.0
Microsoft Internet Explorer 3.0	1996	JavaScript 1.0 (JScript 1.0)
Netscape Navigator 3.0	1996	JavaScript 1.1
Netscape Navigator 4.0	1997	JavaScript 1.2
Microsoft Internet Explorer 4.0	1997	JavaScript 1.2 (JScript 3.0)
Netscape Navigator 4.5	1998	JavaScript 1.3
Microsoft Internet Explorer 5.0	1999	JavaScript 1.3 (JScript 5.0)

Publication date of HTML specifications:

HTML version	Publication
HTML 3.2	14 Jan. 1997
HTML 4.0	24 April 1998
HTML 4.01	24 Dec. 1999



Intranet

The following must be observed when defining technologies applicable on the intranet sites:

- Only technologies that can be interpreted by the portal engine – currently Microsoft Sharepoint Portal Server 2003 – may be used.
- When selecting from available technologies, the internal developer support of the technology must be taken into consideration.
- The related applications must be implemented jointly with tools capable of cooperating with the above technologies and applied in the development practice of the MNB (currently Microsoft Visual Studio .NET tools).
- The restrictions contained in the standard work environment definition of the MNB are applicable to the client side technologies and tools (currently Microsoft Internet Explorer 6 x, subject to restrictions defined by the applied policies)



TECHNOLOGICAL RESTRICTIONS

The Internet and intranet pages should preferably publish content where the use of JAVA applets, FLASH and other installable plugins is not necessary. Content that specifically requires the use of the above technologies is exempted from the above rule. The use of such technologies is in all cases, subject to approval by the independent Communications Department of the MNB and must fully comply with the MNB security regulations

BROWSER COMPATIBILITY

In the course of configuring the technology applied to pages and page navigation, in addition to the provisions defined under Sections 4.1 and 4.2, in relation to the following browser types

- Mozilla 1.2.1 (Win32, Mac OS X, Mac OS 9, Linux),
- Internet Explorer 6 (Win32),
- Internet Explorer 5 (Mac OS X, Mac OS 9),
- Opera 7 (Win32, Linux),
- Netscape 4.5 (Win32, MacOS 9, Linux),
- Safari (Mac OS X).

the functions below must always operate without error messages:

- main and submenu items, menu item selection,
- accurate and complete display of content,
- input fields, menu selectors (FORM),
- pop-up windows (POP-UP),
- use of style sheets (CSS)



MNB WEB DESIGN – HTML FORMAT

The MNB Web Design is also ready in HTML format, available at the independent Communications Department

The HTML format manual can be launched by clicking on the "index.html" file in the CD root directory.

The HTML format manual may be viewed in any PC configuration in which the Internet Explorer 5 browser or equivalent browser or a compatible browser program with a higher version number and its basic functions are installed

Magyar Nemzeti Bank Expedicio
Szabadsag ter 8-9
Entrance from Kiss Ernoe utca
1054 Budapest
Hungary

— ORIGINAL —

05 December 2011

**Cover Sheet for Final Bid
KBE/126/2010 - Subscription to a portfolio management system**

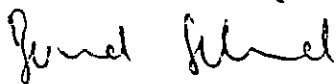
To whom it may concern,

Hereby we submit the final bid as part of the tender KBE/126/2010.

Please, note that the UBS Delta functionality we will deliver has been specified in our reply to your RFP.
We attach the following documents (one original, one copy) to the final bid (Table of Contents):

1. This Cover Sheet
2. Table of Contents
3. Project Fiche [Annex 1];
4. Tenderer's declaration in line with Section 70(2) of the PPA
5. Professional Offer
6. Completed Draft Contract
7. Document certifying the availability of a bid bond amounting to HUF 3,000,000, i.e. three million forints, has already been submitted

UBS AG



London, 5th December 2011

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1. This Cover Sheet.....	p1
2. Table of Contents.....	p2
3. Project Fiche (Annex 1).....	p3
4. Tenderer's declaration in line with Section 70 (2) of the PPA.....	p4
5. Professional Offer.....	p7
6. Completed Draft Contract	
a. License Agreement.....	p9
b. Appendix 1. (Specification of Requirement)	p23
c. Appendix 2 (Extract of the Tender Offer of the Licensor).....	p34
d. Appendix 3 (Detailed Rules of Payment of the Consideration).....	p86
e. Appendix 4 (Statement of Authorization).....	p88
f. Appendix 5 (Certification by the Insurance Broker of the Licensor).....	p90
g. Appendix 6 (General Terms and Conditions of the Licensor).....	p92
7. Documents certifying the availability of a bid bonds amounting to HUF 3,000,000.....	p120

PROJECT FICHE

Tenderer's name: UBS Limited

.....

Registered office (place of residence): London, United Kingdom

.....

Name of the Tenderer's contact person: Dr. Bernd Schmid

.....

Telephone: +44 20 7568.7651

Telefax: + 44 20 7567 0866

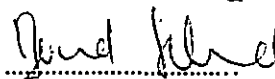
E-mail address: bernd.schmid@ubs.com

Our offer submitted in the negotiated public procurement procedure launched by the Magyar Nemzeti Bank as Contracting Authority through the announcement entitled 'Subscription to portfolio management system (KBE/126/2010)' is as follows:

Band	Total number of users	Annual net fee, EUR	Extra user net fee/ user/year, EUR	Number of extra users	Total net fee/year, EUR	Unit net fee/month, EUR	Unit net fee/quarter year, EUR
<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	$e = b - a$	$f = c + (d * e)$	$g = f / b / 12$	$h = 3 * g$
5	5	120,000	8,000	0	120,000	2,000	6,000
5	6	120,000	8,000	1	128,000	1,778	5,333
5	7	120,000	8,000	2	136,000	1,619	4,857
5	8	120,000	8,000	3	144,000	1,500	4,500
5	9	120,000	8,000	4	152,000	1,407	4,222
5	10	120,000	8,000	5	160,000	1,333	4,000
5	11	120,000	8,000	6	168,000	1,273	3,818
5	12	120,000	8,000	7	176,000	1,222	3,667
5	13	120,000	8,000	8	184,000	1,179	3,538
5	14	120,000	8,000	9	192,000	1,143	3,429
15	15	200,000	5,000	0	200,000	1,111	3,333

Please, according to the calculating rules fill out completely the following columns: c,d,f,g,h

London, 5th Dec 2011



 authorised signature

m

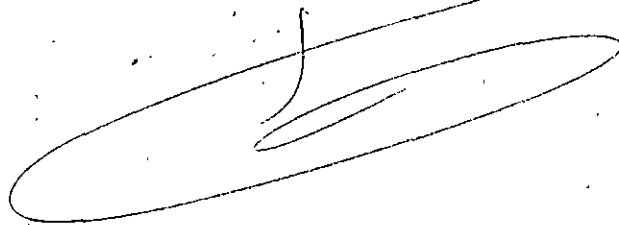
3 B.S.

N P Ready
R M Campbell
J B Burgess
E Gardiner
A J Claudet
I A Rogers

A Grafton
L Hyde-Vaamonde
M Scott

TO ALL TO WHOM THESE PRESENTS SHALL COME, I
JEREMY BROOKER BURGESS of the City of London, England
NOTARY PUBLIC by royal authority duly admitted, sworn and
holding a faculty to practise throughout England and Wales,
DO HEREBY CERTIFY the genuineness of the signature
subscribed to the document hereunto annexed, such
signature being in the own, true and proper handwriting of
BERND MARKUS SCHMID, whose identity I attest and who is an
authorised signatory of **UBS LIMITED**, a United Kingdom
company duly organised and existing, registered with the
Registrar of Companies for England and Wales under number
02035362.

IN FAITH AND TESTIMONY WHEREOF I the said notary have
subscribed my name and set and affixed my seal of office in
London, England this fifth day of December in the year two
thousand and eleven.



4 BS.



Regulated by the Faculty Office of the Archbishop of Canterbury

Bankside House 107 Leadenhall Street London EC3A 4AF
Tel 020 7623 9477 Fax 020 7623 5428

E-mail notary@cheeswrights.co.uk
DX 627 / London City EC3 www.cheeswrights.co.uk

Canary Wharf office Tel 020 7712 1365

APOSTILLE

(Hague Convention of 5 October 1961 / Convention de La Haye du 5 octobre 1961)

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

- 1 Country: United Kingdom of Great Britain and Northern Ireland
Pays: Royaume-Uni de Grande-Bretagne et d'Irlande du Nord
This public document / Le present acte public
- 2 Has been signed by **Jeremy Brooker Burgess**
a été signé par
- 3 Acting in the capacity of **Notary Public**
agissant en qualité de
- 4 Bears the seal/stamp of **The Said Notary Public**
est revêtu du sceau/timbre de
- 5 at London/à Londres
- 6 Certified/Attesté
the/le **05 December 2011**
- 7 by Her Majesty's Principal Secretary of State for Foreign and Commonwealth Affairs /
par le Secrétaire d'Etat Principal de Sa Majesté aux Affaires Etrangères et du Commonwealth
- 8 Number/sous No **J076358**
- 9 Stamp:
timbre
- 10. Signature **J. Casey**



For the Secretary of State / Pour le Secrétaire d'Etat

If this document is to be used in a country which is not party to the Hague Convention of 5th October 1961, it should be presented to the consular section of the mission representing that country.

An apostille or legalisation certificate only confirms that the signature, seal or stamp on the document is genuine. It does not mean that the content of the document is correct or that the Foreign & Commonwealth Office approves of the content.

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**TENDERER'S DECLARATION
PURSUANT TO ARTICLE 121(3) OF THE PPA**

I, the undersigned, David Schmid as the person vested with the power of representation of UBS Ltd., London, the Tenderer (company name, registered office), being aware of my responsibility,

declare

that hereby we wish to submit an offer in the accelerated negotiated public procurement procedure launched by the Magyar Nemzeti Bank as Contracting Authority through the announcement entitled 'Subscription to portfolio management system (KBE/126/2010)'.

We acknowledge that the terms and conditions set forth in the invitation to participate, in the contract notice and the documentation as well as in other documents related to the public procurement procedure are binding upon us as tenderers, in accordance with the provisions set out in Article 127 (2) of the PPA.

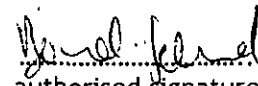
We declare that we have become acquainted with, understood and accept with this declaration the provisions of the PPA as well as all the content and form requirements, instructions, terms and conditions included in the invitation to participate, the contract notice and the documentation, and that we have prepared and are submitting our offer accordingly. The invitation to participate, the contract notice and the documentation were suitable for us to compile an adequate offer, and we have prepared our offer accordingly.

We declare that the statements made in our offer correspond to the facts.

We declare that we have the adequate right and expertise to perform the work applied for.

We, as winners of the procedure, undertake to conclude the draft contract issued in the Documentation with the Contracting Authority **WITHOUT ANY CHANGES** (the ellipses in the draft contract should duly be completed), and to carry out the work for the amount of compensation indicated in the project fiche. **WE HAVE NOT MADE ANY CHANGES TO THE DRAFT CONTRACT.**

5th Dec, 2011 ...London


authorised signature

Professional Offer.

The Professional Offer can be found in Section 6c Appendix 2 (Extract of the Tender Offer of the Licensor). The below section constitutes a supplementary clarification as discussed with the Contracting Authority to the License fee and Payment Conditions in the context of the final offer.

All charges (unless specified) are quoted in EUR and apply annually.

Charges are comprised of the constituent service elements that the client, in agreement with UBS, has elected to use.

UBS Delta Website access:

Core offering

The UBS Delta core offering comprises use of the web application for an agreed number of users.

Core functional modules include:

- Breakouts
- Cashflows
- Market Analytics
- Pool Monitor
- Risk (including Scenarios, Parametric risk, Historical VaR)
- Return Attribution
- Optimiser & Hedge Calculator

Charging for the core offering is reflected in a per-user, per-annum charge as follows:

For non-admin users:

Max number of users (band)	Annual Charge	Charge per extra user until next band
5	120,000	8,000
15	200,000	5,000

For example:

6 users would be charged:
120k (5 user band) + 1*8k (1 extra user) = 128k EUR

15 users would be charged:
200 k (15 user band)

Premium functionality

Premium functionality is categorised by asset class and by functional module. UBS may also agree to provide access to Client to certain premium functionality of UBS as follows:

Functional Modules

Module	Charge
CVA	Subject to separate agreement
Rules Engine	Subject to separate agreement
Extract of Curve Data	Subject to separate agreement

Asset Classes

Asset Class Group	Charge
Structured Credit	Subject to separate agreement.
Other Structured (incl. multi-asset hybrid, str libor)	Subject to separate agreement

All purchased premium functionality is enabled for all relevant Client Users.

Optional automated UBS Delta Reporting

UBS Delta offers clients the optional service of the scheduled running of batch reports, and building and scheduled running of customised reports, bespoke to the client.

Automated batch reports are subject to an aggregate reporting charge per annum. Further details can be provided upon request.

Subject to separate agreement.

Guend Schindl

UBS Delta

Dr. Bernd Schmid
Tel +44-20-7568 7651
Fax +44-20-7567 0862
Bernd.schmid@ubs.com

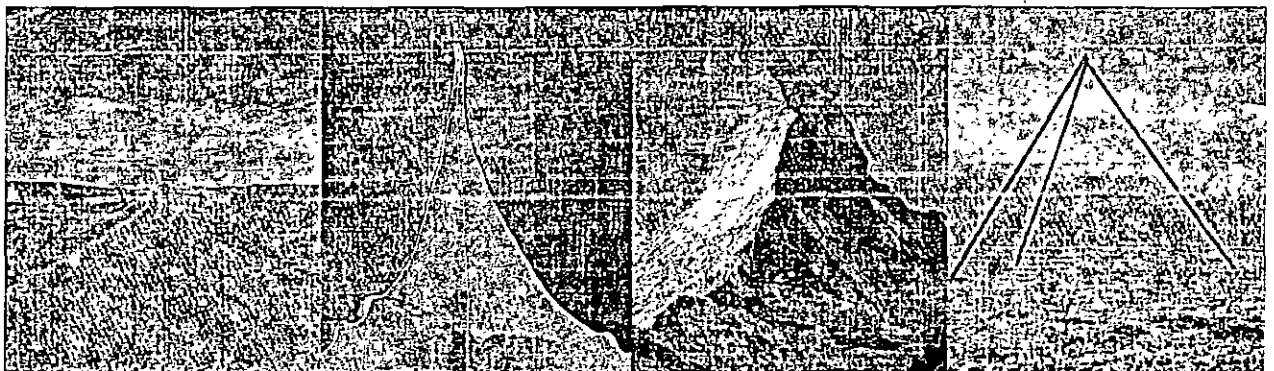
www.ubs.com

UBS Delta Tender

Client: Magyar Nemzeti Bank

"By harnessing internal and external creativity, developing an architecture that can bring resources together to solve problems from end to end, and providing the investment necessary to keep pace with the market and client requirements, UBS has created a system that is now at the forefront of the fixed-income and structured products markets."

Risk Awards, 2007



Classification
Date
Author(s)

Strictly confidential
13 September 2011
Dr. Bernd Schmid

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2 Preliminary implementation concept.....	5
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30.0.0.



UBS Delta is very happy to be considered as a Risk Management System (RMS) provider for Magyar Nemzeti Bank. The description of the services below are given to the best of our abilities but cannot be exhaustive, if there are any responses you feel require more explanation or examples then please let us know and we can come back very quickly with additional information.

1 Executive Summary.

1.1 UBS Delta – successful and established in the market

Cross-asset portfolio management

UBS Delta is an innovative market and portfolio analysis tool, helping asset managers, banks and hedge funds manage risk and performance across fixed income, commodities and equities.

Proven performance

UBS Delta is an enhanced and expanded offering of UBS's award-winning CreditDelta product, which was named Euromoney's Best Portfolio Analytics tool 2001-2005, Risk magazine's Best In-House System, 2007 and voted Euromoney's No.1 Electronic Platform, 2007. For a more detailed list of awards see below.

Global, tailored solutions

UBS Delta's risk and return management system is supported by a global team of dedicated professionals who provide bespoke analyses in areas such as asset-liability management, structured credit, portfolio optimisation, strategic asset allocation, transition management and program trading.

Seamless delivery

UBS Delta is available over the internet, eliminating the need for expensive and time consuming installation. The automatic portfolio upload capability and open architecture with multiple third party data and analytics feeds easily integrate with clients' existing systems.

1.2 Main functionalities

UBS Delta is an integrated, web-hosted portfolio risk management system (application service provider [ASP]) covering fixed income, equities, and commodities. Reporting tools provide exposure, actuarial, risk performance and statutory reporting in flexible file formats. Optimisation tools support liability-driven investment hedging, including a wide range of derivative overlays and cashflow modelling of individual assets.

Products & Services:

- Cross Asset (Fixed Income, Equities, and Commodities) web-based platform for
 - Market Data Monitoring and Analysis
 - Portfolio Management & Construction, Dicing and Slicing wrt many analytics
 - Risk Management, absolute and relative risk measures, scenarios, stress tests
 - Performance Measurement & Attribution
 - Asset Liability Management
 - Strategic and Tactical Asset Allocation, enhanced strategic AA can be offered with a partner if necessary
- Customised automated Risk and Performance Reporting (Actuarial reporting, etc.)

- Bespoke Analyses such as pre trade analyses, analysis of trading and hedging strategies, portfolio optimization etc.
- Transition Management
- UBS Delta Training and Workshops

1.3 References

Clients:

- External: Currently around 200 external clients globally: banks, private banks, asset managers, hedge fund managers, pension fund managers, insurance companies, corporates
- Internal clients: Various departments within UBS Investment Bank, UBS Global Asset Management and UBS Wealth Management & Business Banking

Amongst these clients are:

- AXA GIE
- LGT
- Royal London
- ING
- Union Investment
- GROUPAMA Asset Management
- BNP Paribas Investment Partners
- Swiss Life
- Legal and General
- Aviva

Proven Performance:

Credit Technology Innovation Awards, Credit Awards 2010
 Best Provider of actuarial Software, Life & Pension Risk Awards 2010
 Technology Innovation Award, Credit Magazine 2009
 Best Technology Vendor for Pricing and Analytics Risk Management, Credit Awards 2009
 Best Technology Vendor for Pricing and Analytics, Credit Awards 2009
 No.1 Electronic Platform, Euromoney Fixed Income Research Poll 2008
 Best In-House Developed or Proprietary Technology, Buy-Side Technology Awards 2007
 No.1 Electronic Platform, Euromoney Fixed Income Research Poll 2007
 Best In-House System, Risk Magazine Awards 2007
 Best Site for Portfolio Analytics, Euromoney Technology Awards 2005-01

1.4 Pricing

Annual fees based on the number of users/licenses and components use

For non-admin users:

Max number of users (band)	Annual Charge		Charge per extra user until next band	
		Service Profile 2*		Service Profile 2*
1		90,000		15,000
5		150,000		10,000



15		250,000		8,000
25		330,000		7,000

For example:

10 users under service profile 2 would be charged:
150k (5 user band) + 5*10k (5 extra users) = **200k EUR per year**

15 users under service profile 2 would be charged:
250 k (15 user band) per year

Admin users are cheaper:
Service profile 2 – 7k/admin user

* For details on the definition of Service Profile 2, please see chapter 4

2 Preliminary implementation concept.

2.1 Data content and data management

2.1.1 Data content

1) Coverage of Asset Classes and Asset Types

UBS Delta offers a multi asset platform, with wide coverage across fixed income, equities and commodities, both in respect of cash and derivative assets. Below you will find an extensive list of the assets supported analytically in UBS Delta.

We have highlighted the assets specified in the Technical Specifications in italic.

- **Fixed Income cash and derivatives**
 - *Fixed, Step, Floating Coupon, Callable, Puttable, Sinking, Index-Linked, HY, EM bonds*
 - *MBS pass-through & US/European ABS*
 - *Synthetic instruments E.g. private placements, loans, CP, money market*
 - *Futures (bond and interest rate)*
 - *CDS & CDS Indices & tranches on CDS indices*
 - *Swaps (E.g. Vanilla, CMS, basis, Inflation-Linked Swaps)*
 - *Interest Rate Swaptions & Caps/Floors*
 - *Cap/Floor*
 - *Cash*
 - *Exotics on a case-by-case basis (E.g. Steepeners, Range-accruals, Inverse floaters)*
 - *Synthetic CDO, synthetic CDO² & Nth-to-Default Notes*
 - *Repo (replicating trades)*
- **FX:**
 - *Currency Forwards*
 - *Cross-Currency Swaps*
 - *FX Option*
 - *FX Future*

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- **Liabilities/Cashflow Streams**
- **Funds**
 - Funds of funds
 - ETFs
- **Equities cash and derivatives**
 - Common Stock
 - Equity Index Futures
 - Stock/ Futures Options
 - Convertible Bonds
 - Barrier Options
 - Equity Swaps
 - Equity Warrants
 - Equity Right
 - Equity Future
- **Commodities**
 - Commodity Futures

We expect almost all of the client's assets to be covered by UBS Delta. If for a very small limited number of transactions we do not have static or pricing information available the instruments can be set up synthetically.

2) Prices and Data Sources

UBS Delta has access to various pricing sources, including the following partnerships:

- Reuters (broad alliance to cover cross-asset pricing and static data)
- Bloomberg data
- Swiss bonds exchange
- Markt Partners (CDS & ABS pricing)
- GFI (CDS pricing)
- iBoxx (distribution of indices, index constituents).
- UBS Investment Bank

In addition we have providers for static data (e.g., Bloomberg, GICS, iBoxx etc) as well as direct feeds from the rating agencies: Moody's, S&P, Fitch.

The availability of a wide range of robust pricing feeds enables cross-referencing and selection of 'best' pricing according to the level of distress in the market and catharsis of pricing providers: In general if a bond is in iBoxx then we would use that as a primary price source for valuation, performance and risk purpose: For CHF denominated bonds, we follow the market standards providing the prices from the Swiss Bond Exchange. In addition, a 5 year contract between UBS Delta and Reuters has been signed to provide detailed pricing, analytics and static data on a wide range of assets. Prices are received and processed daily and entered into the database for the End-of-Day valuation. High data quality is ensured by our own data team and automatic data checks that are in place.

What is very unique to UBS Delta is providing multi asset price overview, i.e. you can see prices of e.g. bonds, CDS, stocks of the same issuer on one page. This allows clients to monitor markets across different asset classes.

In addition to the raw data UBS delta provides access to modified data as well, e.g. on a daily basis we estimate issuer/spread curves of thousands of issuers – the curves are used as basic building blocks of our risk model.

All data is also available on a historical basis.

Is the system based on transactions or holdings?

Either transactions or holdings.

How does the system handle market data?

UBS Delta has an extensive database of both static and historic data on all asset classes supported in the system.

The barriers to getting data into the system are very low – generally consisting at the minimum of some market identifier, nominal holding and portfolio code to load data into. For full risk analysis, position loads are sufficient. For performance calculations then historical transactions are preferable, but that comes with a maintenance and reconciliation overhead

Can the user overwrite security characteristics? Can the user provide its own data? (E.g. curve).

Yes. Any custom classification or characteristic can be provided – such as client sector, client rating, fund manager, curve etc.

At present we do not support overriding of analytics or asset assumptions (such as maturity, duration) – however this can be achieved by creation of synthetic assets with those characteristics.

Does the system have facilities to record and maintain fundamental data for securities, including basic security setup and market details? What types, if any, of fixed income data can be held in the security master, (e.g., ratings, interest rates, etc.).

Static Data:

Coupon schedules, cashflows, daycounts, holidays, maturity dates, etc are all stored in the system and passed into the analytics engine. If they are not present then assumptions will be made based on the asset type, currency and country to enable appropriate defaults to be applied.

Identifiers:

ISINs are the default identifier for fixed income, and are also supported for equities. Ticker-exchange combinations are default identifiers in Equities. UBS Delta also accepts many other identifiers, such as CUSIPs or ISMA numbers. Where ISINs are not readily available we can use the ticker or REDId to load in some instruments like credit defaults swaps.

Pricing:

UBS Delta has access to various pricing sources. In general if a bond is in iBoxx then we would use that as a primary price source for valuation, performance and risk purposes. The events of the last 12 months have highlighted the need for a robust suite of pricing feeds to enable cross-referencing and selection of 'best' pricing according to the level of distress in the market and catharsis of pricing providers.

A 5 year contract between UBS Delta and Reuters has just been signed to provide detailed pricing, analytics and static data on a wide range of assets. We view this as the first step towards full data independence from UBS, and reduced reliance on middle-market data providers.

For performance purposes, any price can be uploaded and used in performance calculations. Regardless of the price used to calibrate the risk and volatility calculations, whatever benchmark or administrator-provided asset prices are available to the client can be uploaded into Delta and used to compute performance.

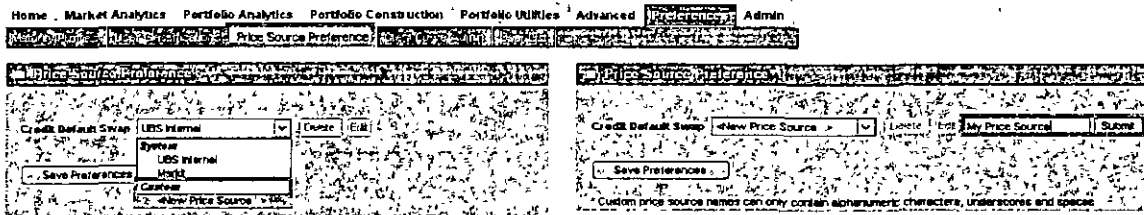
CDS data and CDS indices:

UBS Delta has a fully pre-loaded database of iBoxx and iTraxx benchmarks with historical price and constituent data. This also includes correlation curves for iTraxx Index Tranches.

CDS single-names are referenced by ticker, obligation identifier (ISIN) or by RedID. We have underlying CDS data coming from UBS, GFI (CDS Broker) and Markit Partners (CDS data vendor).

Custom CDS data can also be uploaded directly into UBS Delta:

- ◆ Create new CDS price source:



- ◆ Upload File:

- Mandatory Fields
 - AssetType = CRV
 - PriceSourceName e.g. My Prices
 - CurveID e.g. EUR-AAB-SEN-MMR-DC
 - CurveDate e.g. 1-Feb-08
- Optional Tenors (must specify at least one)
 - 3M, 6M, 1Y, 2Y, 3Y, 4Y, 5Y, 6Y, 7Y, 8Y, 9Y, 10Y, 15Y, 20Y, 30Y, 40Y, 50Y, 100Y
- Upload tenor values in basis points

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	AssetType	PriceSourceName	CurveID	CurveDate	6M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	30Y
2	CRV	My Prices	EUR-AAB-SEN-MMR-DC	1-Feb-08	19,994	23,876	32,803	38,112	43,245	50,188	52,032	55,050	57,626
3	CRV	My Prices	EUR-ACOR-SEN-MMR-DC	1-Feb-08	19,788	22,365	29,538	36,477	46,792	54,505	63,676	66,083	74,216
4	CRV	My Prices	EUR-ADCO-SEN-MMR-DC	1-Feb-08	19,125	27,952	29,365	42,553	60,436	71,026	80,734	90,448	92,392
5	CRV	My Prices	EUR-AEGON-SEN-MMR-DC	1-Feb-08	36,880	30,181	36,473	45,801	60,800	61,372	84,816	89,220	81,738
6	CRV	My Prices	EUR-AERO-SEN-MMR-DC	1-Feb-08	22,000	25,159	25,322	40,755	53,239	60,678	67,414	74,203	76,521
7	CRV	My Prices	EUR-AKZO-SEN-MMR-DC	1-Feb-08	9,776	17,185	22,496	28,440	38,755	46,847	52,213	57,842	61,873
8	CRV	My Prices	EUR-ALTM-SEN-MMR-DC	1-Feb-08	28,600	30,750	39,706	50,064	63,910	74,722	87,536	93,132	92,742
9	CRV	My Prices	EUR-ALZ-SEN-MMR-DC	1-Feb-08	27,943	32,430	28,518	36,760	47,000	49,013	51,396	49,461	52,000
10	CRV	My Prices	EUR-ASSGEN-SEN-MMR-DC	1-Feb-08	21,065	24,530	30,350	36,770	46,356	49,331	51,588	59,850	61,080

Ratings:

UBS Delta supports direct daily feeds from S&P, Moody's and Fitch credit rating agencies. The UBS Composite Rating in UBS Delta is a conservative aggregation of the three agency ratings.

User-defined ratings:

You can use you own ratings with synthetics bonds. For other assets you can either map your internal ratings to S&P, Moody's, Fitch or UBS Composite Ratings. UBS Composite Ratings are the more conservative of S&P, Moody's or Fitch. Alternatively you can upload your own ratings with using a user-defined property.

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Interest rates:

We have a full history of rates across all supported currencies. If a user wishes to upload their own rates curve then this is entirely possible. We maintain a full library of interest rate daycount defaults for all related derivatives.

Does the proposed system support automatic cross matching between CUSIP, Sedol and ISIN?

Yes, subject to client-side licences for CUSIP and Sedol use.

How is time-series data such as coupons and factors updated in the system?

In general, these are pre-populated and not needed other than for specific cashflow-based instruments which can be set up directly via uploads.

Factors could be uploaded as a time series - as fund units and/or end-of-day quotes

How does the system handle corporate actions?

We pay for and take corporate action feeds directly from vendors. (Currently, this is Bloomberg and Reuters.)

The system uses this data in different ways dependent on the type of corporate action.

For example

- (i) for a stock split we adjust historic positions accordingly;
- (ii) for a default, we do not calculate bond analytics but just offer a PV for the position;
- (iii) for takeovers, mergers, spinoffs, we make changes to our entity/issuer structure as appropriate;

However, historic changes to issuer classification are not reflected as they occur within historic functions such as return attribution and historic risk: we simplify these by using the current issuer structure.

3) Fixed Income Indices

Through UBS Delta, clients have access to the constituents and index analytics for the full family of the following index families:

- IBoxx
- SBI (Swiss Bond Indices)
- iTraxx and CDX indices

In addition, all other indices can be uploaded by the user in form of the underlying constituents. These can be assigned to users portfolios as benchmarks for performance and risk analysis.

4) Descriptive Information/ Static Data

From our data providers, such as Reuters, Bloomberg, S&P, Moody's, Fitch and Iboxx and UBS internal databases we receive a multitude of descriptive static information in respect of the available securities. This contains amongst other issuer specific data such as industry sectors (e.g. Iboxx Level1-6, GICS),

currency, region and rating. In respect of the individual security we provide, amongst other, ISINs, amounts outstanding, issue date, coupons, maturity, seniority and bond types.

Additionally to the data provided by UBS Delta; users have the ability to define their own static data in respect of any identifier. This may be used to implement client specific sectors, or internal ratings. This can be implemented as part of the users automated portfolio updates.

All the static fields are available throughout UBS Delta functionalities as categories for aggregation, both for the defined benchmarks as well as user's portfolios.

5) Credit Risk Rating Data

Rating information from S&P, Moody's and Fitch is provided for all rated securities. A further field, Composite Rating, is defined as the worst rating from the three above mentioned providers.

CDS spreads of issuers are also available on our platform: the data is available from Markt Partners (license needs to be signed) or from GFI/UBS within the UBS Delta contract for no additional costs.

2.1.2 Data management

1) Customisable Indices

UBS Delta's MarketAnalytics functionality allows to filter the constituents of indices by various criteria. Based on the subset of constituents clients can define their own indices. In addition the Benchmark Utilities in UBS Delta support the building of new indices as weighted index of already existing indices. Any portfolio can be used as benchmark as well. All indices can be saved.

2) Financial Indices

UBS Delta supports a huge number of analytics. They can be calculated on portfolio level, for any sub category such as rating classes, currencies, maturity bands, sectors etc down to the single instrument level. They are available at random times.

Analytics supported include:

Portfolio Analytics: Nominal (%), PV (%), Positions

Fixed Income Analytics/General Analytics: Dollar Return, Exposure, Government Spread, Income Yield, Leverage Metric, Liquidity Score, Margin, Return, Return Contribution, Return on Nominal, Return on Nominal Contribution, WARF, WAL, Yield, Yield to First, Yield to Worst, Z Spread

Fixed Income Analytics/Rate Sensitivities: Convexity, Convexity Contribution, Dollar Convexity, Dollar Duration (%), Modified Duration, Mod Duration Contribution, Duration to First, Duration to First Contribution, Duration to Worst, Duration to Worst Contribution, Effective Duration, Effective Duration Contribution, LiborDeltaD1 (sensitivity to 1 bp parallel shift of interest rate curve), LiborDeltaD2, LiborDeltaD3, Macaulay Duration

Fixed Income Analytics/Spread Sensitivities: CreditDelta TS, CreditDeltaD1 (sensitivity to a 1 bp parallel shift of spread curve), CreditDeltaD2, CreditDeltaD3, Spread DTS, Spread DTS Contribution, Spread Duration, Spread Duration Contribution

Fixed Income Analytics/Inflation Sensitivities: InflationDeltaD1, InflationDeltaD2, InflationDeltaD3

UBS

Fixed Income Analytics/Option Sensitivities: CAPVega, FX Vega, IR Total Vega, SPNVega

Further more, we provide Equity and MBS Analytics as well

2.2 Functionality

2.2.1 Asset Allocation

1) Support of strategic asset allocation

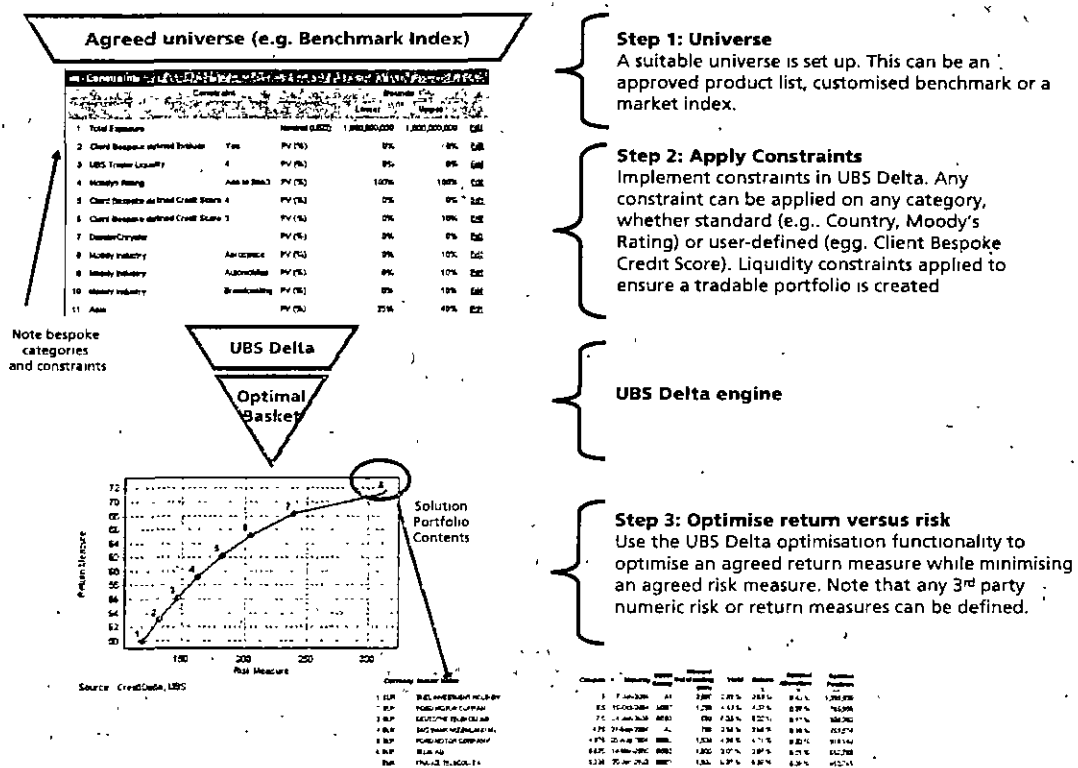
For strategic asset allocation UBS Delta supports a 1 year horizon. Based on indices on asset class level and our historical simulation based approach risk return profiles can be determined, and SAA decisions can be based on profound analyses. If long term (e.g. 5 years or more) analyses are needed we can work with an external partner complementing our own asset allocation offer.

2) Support of tactical decisions

Given a strategic allocation UBS Delta allows to implement tactical decisions based on our portfolio construction functionalities. This includes going long and short based on derivative overlays and synthetically increasing or decreasing exposure. E.g., this can be driven by a risk budgeting methodology. Furthermore, UBS Delta provides portfolio optimization techniques using different return and risk measures. Optimizations work for client chosen investment universes and under consideration of arbitrary investment constraints, including issue, issuer and generic constraints.

In the following we show our basic concept of portfolio optimization and construction:

Portfolio Optimisation – Overview



Optimisation Constraints

View Constraints

Constraint	Category	Unit	Lower Bound	Upper Bound	Action
1		Nominal (base)	100,000,000.00	100,000,000.00	Edit
2	UBS Bread Png	R/R to BB	0.00	0.00	Edit
3	Sec_yof	1	0.00	10,000,000.00	Edit
4	Z_Score	1	0.00	10,000,000.00	Edit
5	S&P Rating Neg_Match	BBB-	0.00	0.00	Edit
6	CO-UBS Country	IL	0.00	0.00	Edit
7	Issuer	TELECOM ITALIA SPA	0.00	0.00	Edit
8	Issuer	TANEFU CORPORATION	0.00	0.00	Edit
9	S&P Industry	Aerospace and defense	0.00	15,000,000.00	Edit
10	S&P Industry	Air transport	0.00	15,000,000.00	Edit
11	S&P Industry	Automotive	0.00	15,000,000.00	Edit
12	S&P Industry	Beverage and tobacco	0.00	15,000,000.00	Edit
13	S&P Industry	Chemicals	0.00	15,000,000.00	Edit
14	S&P Industry	Issue Constraints			
15	S&P Industry	BU			
16	S&P Industry	BU			
17	S&P Industry	BU			

These are constraints based on user-defined properties.

Issuer-by-issuer constraints limit the max nominal for each issuer.

Issuer	Country	Currency	Rate	Par Value	Par Value	Par Value	Lower Bound	Upper Bound	Par Value
1	USA	USD	A1	1,000,000	0	0	0	2,000,000	0.214
2	USA	USD	BBB	1,000,000	0	0	0	2,000,000	0.250
3	USA	USD	BBB	1,000,000	0	0	0	2,000,000	0.250
4	USA	USD	AA3	1,000,000	0	0	0	2,000,000	0.215
5	USA	USD	A1	1,000,000	0	0	0	2,000,000	0.142
6	USA	USD	B1	1,000,000	0	0	0	2,000,000	0.376

Select Risk and Return measures

Universe

Portfolio: TestPP

Benchmark: TestBM (E)

Supplement: None

Valuation Date: 5-Dec-2005

Universe: Build

Feasibility: Check

Optimize

Optimization Settings

Return Measure: Rolldown 3M

Risk Measure: Tracking Error

Excess Return (Rp):

Frontier Points: 10

Portfolio: Plot

Universe: Restrict

Aggregation: Nominal

Round Trades:

Rolldown 3M

Rolldown 3M

Rolldown 1M

Spread

Spread (Nom)

Beesnote Return

Select any of the risk and return measures available in the system or specify your own

Use this to "zoom in" on any portion of the efficient frontier

Checking this box will plot the current portfolio holdings with the efficient frontier

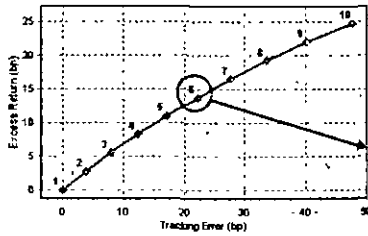
Once you have finalised your settings, click Optimize to run the optimisation.

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Viewing results

Optimisation Results



Source: CreditDelta, UBS

	Tracking Error	Excess Return	Sharpe Ratio	Number of Assets	Volatility	Return	Duration	Yield	Rating Factor	PV	Error Code
1	9.94	6.94	0.00	20	6.60	5.83	4.73	3.37	99	100,000,000	0
2	1.36	2.76	0.71	20	6.61	5.85	4.76	3.38	108	100,000,000	0
3	7.82	5.51	0.70	19	6.62	5.86	4.79	3.39	114	100,000,000	0
4	12.28	6.27	0.67	18	6.63	5.91	4.83	3.40	121	100,000,000	0
5	17.65	11.82	0.65	18	6.65	5.94	4.87	3.41	127	100,000,000	0
6	22.28	13.76	0.62	18	6.66	5.96	4.92	3.41	134	100,000,000	0
7	27.74	16.53	0.60	18	6.68	5.96	4.98	3.43	142	100,000,000	0
8	33.66	19.29	0.57	17	6.70	6.02	5.06	3.44	149	100,000,000	0
9	40.17	22.84	0.55	16	6.72	6.05	5.14	3.45	152	100,000,000	0
10	47.64	24.88	0.52	14	6.75	6.07	5.23	3.47	155	100,000,000	0
P	66.35	-111.42	-0.17	1	0.00	4.71	0.00	4.21	0	100,000,000	0
B	9.94	6.94	0.00	20	6.60	5.83	4.73	3.37	99	100,000,000	0

Save Portfolio | Export to Excel

CCY	Description	UBS Rating	AOS (mm)	Yield	Return	Portfolio PVI	Benchmark PVI	Optimal PVI	Portfolio Position	Benchmark Position	Optimal Position	Trade Size
EUR	CARREFOUR SA (EUR 8.125, 26-May-2012)	A1	1,000	3.20	5.89	0.00%	5.17%	10.00%	0	6,622,703	12,815,573	12,815,573
EUR	KREDIT FLEUR VNEERALFBAU (EUR 3.875, 4-Jul-2013)	AAA	5,000	3.31	5.99	0.00%	4.72%	9.43%	0	6,622,703	13,218,983	13,218,983
EUR	BNE AG (EUR 4.375, 14-Oct-2014)	A2	1,000	3.65	6.53	0.00%	4.78%	9.13%	0	6,622,703	12,703,320	12,703,320
EUR	AVERTIS (EUR 4.250, 15-Sep-2010)	A1	1,500	3.26	5.76	0.00%	4.72%	8.22%	0	6,622,703	11,539,750	11,539,750
EUR	PEUGEOT SA (EUR 5.875, 27-Sep-2011)	A3	1,500	3.47	6.10	0.00%	5.28%	7.74%	0	6,622,703	10,091,998	10,091,998

Each one of the solution portfolios on the efficient frontier satisfies all the constraints and has the lowest tracking error for that excess return. Click on the portfolio number in the summary table to view any solution portfolio, which can be exported to Excel or saved directly into UBS Delta as a new portfolio.

2.2.2 Portfolio Management

UBS Delta "Markets" module is a data tool combining data and analytics across Equity, Commodity and Fixed Income, for example, allowing the inclusion of equity ratios in screening credit default swaps (CDS) and allowing equity players easy input from credit markets. It provides a highly customisable environment for market monitoring and analysis. The underlying data is organised into several broad universes: Bonds, Curves, CDS, Equities, Mortgage Backed Securities (MBS), and a simple button toolbar allows you to select the universes with which you wish to work.

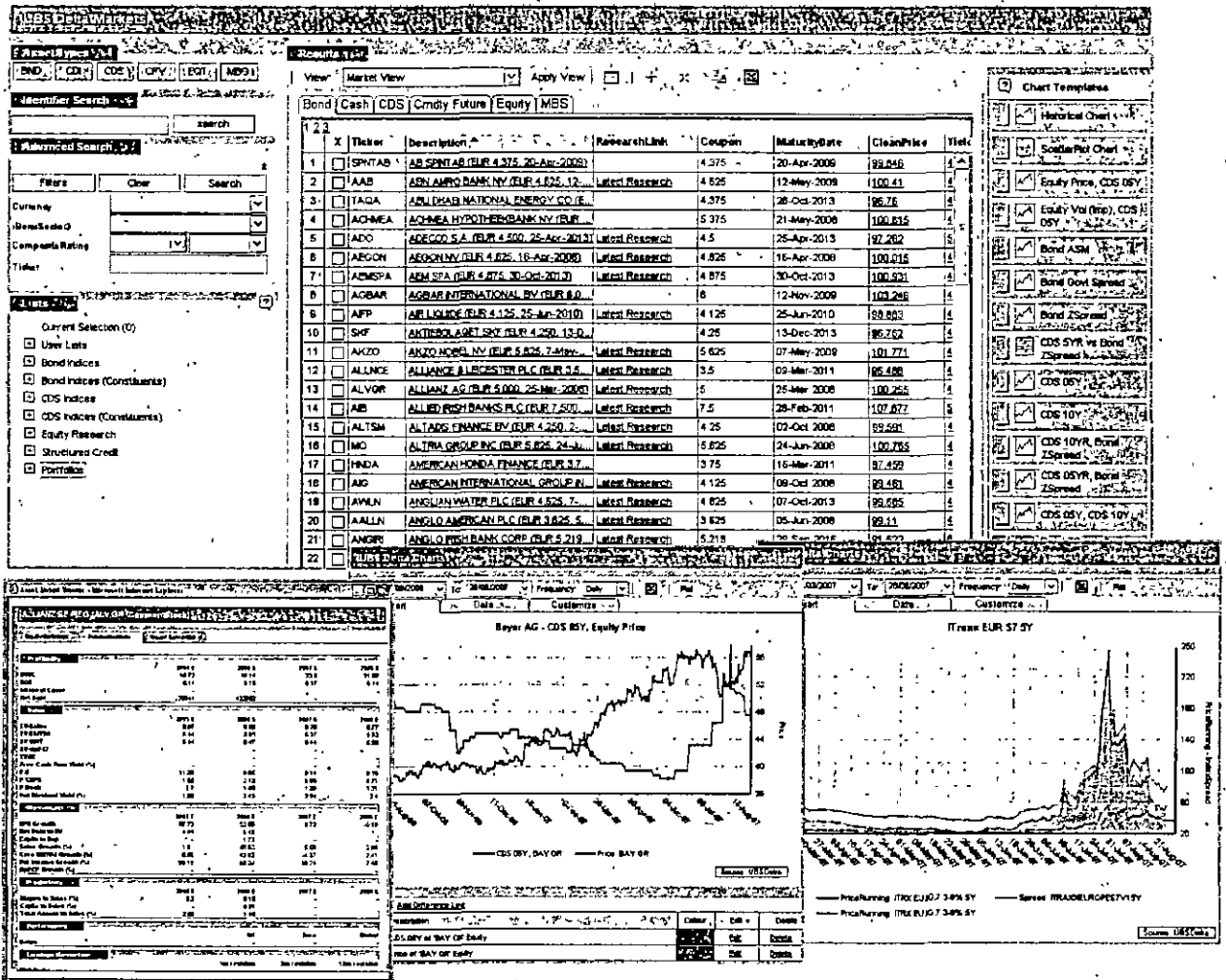
Pricing is sourced from a variety of sources, depending on the asset concerned (Reuters, Markit Partners, iBoxx, IDC, GFI, and UBS.)

Analytics are generated from UBS internal libraries.

Sample screenshots are shown below:

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UBS Delta Portfolio Analytics and Portfolio Management include.

Monitoring (sample screens shown below); includes user-configurable screens and reports; including breakouts using system supplied, or client defined categories.

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UBS Investment Bank UBS Delta

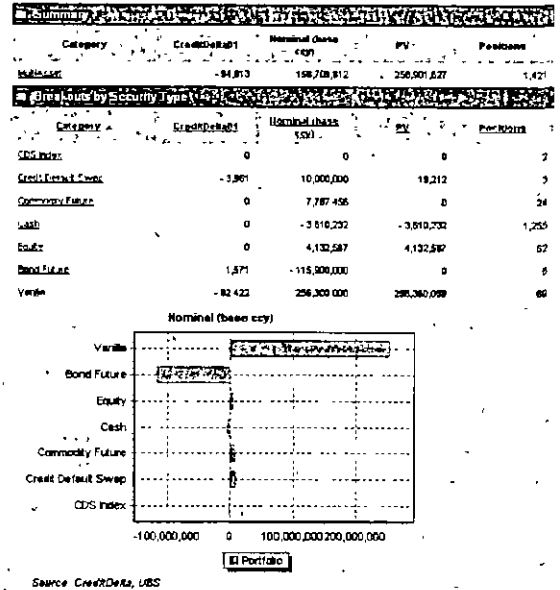
Market Analytics Portfolio Construction Advanced Portfolio Metrics Preferences Maintenance

Trades Manager List Trades Add new Trade

Positions Settings

Summary Bond Bond Future CDS Index Cash Commodity Future CDS Equity

	Description	Currency	Notional	Asset Type
1	BNP PARIBAS BANK NY (AUD 6 250 24-Mar-2010)	AUD	2,000,000	Bond
2	ACELADE BANK LIMITED (ADB AU, Common Stock)	AUD	(118,130)	Equity
3	ADTRANS GROUP LIMITED (ADG AU, Common Stock)	AUD	48,369	Equity
4	AGL ENERGY LTD (AGL AU, Common Stock)	AUD	103,137	Equity
5	ALMTA LTD (AAN AU, Common Stock)	AUD	116,284	Equity
6	Altria Ltd (SBN)	AUD	10,000,000	Credit Default Swap
7	Altria Ltd (SBN)	AUD	(10,000,000)	Credit Default Swap
8	Aluminium (LME) Apr-07	USD	425,475	Commodity Future
9	AMADEUS ENERGY LTD (AMU AU, Common Stock)	AUD	(84,064)	Equity
10	AMERICAN INTERNATIONAL GROUP INC (AUD 6 500, 20-Mar)	AUD	1,000,000	Bond
11	AMP LTD (AMP AU, Common Stock)	AUD	104,434	Equity
12	ANZ BANKING GROUP LIMITED (AUD 6 000, 24-Mar-2008)	AUD	17,100,000	Bond
13	ARISTOCRAT PLATINUM LIMITED (AGP AU, Common Stock)	AUD	123,088	Equity
14	ARISTOCRAT RESOURCES LTD (ALL AU, Common Stock)	AUD	90,909	Equity
15	ASIAN DEVELOPMENT BANK (AUD 6 250, 15-Apr-2011)	AUD	4,400,000	Bond
16	ASX LTD (ASX AU, Common Stock)	AUD	108,373	Equity
17	AUSORILL LIMITED (ASL AU, Common Stock)	AUD	108,657	Equity
18	AUSTROCHESS HOLDINGS LTD (ALB AU, Common Stock)	AUD	118,317	Equity
19	AUSTRALIA POSTAL CORP (AUD 6 000, 26-Mar-2008)	AUD	2,000,000	Bond
20	Australia-10yr (Mar 07)	AUD	66,700,000	Bond Future
21	Australia-3yr (Mar 07)	AUD	(182,600,000)	Bond Future
22	AUSTRALIAN AGRICULTURAL CO (AAC AU, Common Stock)	AUD	107,318	Equity
23	AUSTRALIAN WEALTH MANAGEMENT (AWM AU, Common)	AUD	100,454	Equity
24	BANK NEDERLANDSE OMBEENTEN NY (AUD 6 500, 22-Sep)	AUD	2,000,000	Bond
25	BANK NEDERLANDSE OMBEENTEN NY (AUD 6 250, 10-Jul)	AUD	4,800,000	Bond



The Breakout functionality allows to calculate analytics (for some examples of available analytics see explanation of Financial Indices above) on portfolio level, relative to benchmarks and can be broken out by almost arbitrary properties (Issuer, Issue, Rating, Maturity Band, Sector etc) or user defined properties. The same is true for cash flow analyses.

2.2.3 Risk Analysis

Var: UBS Delta offers 2 Value at Risk models:

- o Parametric (described in detail below)
- o Historic - using past changes to define expected P/L changes; historical simulation

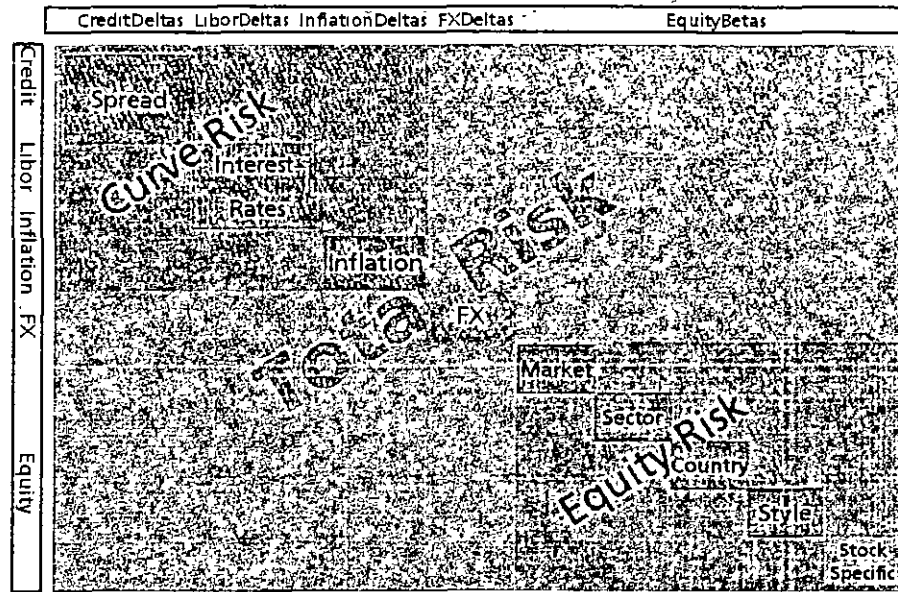
1a) Risk Model - Parametric VaR

The Value-at-Risk tool estimates the maximum expected loss over a given horizon for the selected portfolio. The user specifies a confidence level so that, e.g., with a 95% confidence level, a loss exceeding the Total VaR number would occur over the given horizon with 5% probability. Risk horizon and confidence interval can be chosen flexibly.

Simple value-at-risk is computed assuming a zero-mean normal distribution of portfolio returns. The width of this distribution (and hence the 5% probability point) is determined by the volatility of portfolio returns. The volatility, in turn, is derived from the UBS Delta risk model (see below).

UBS Delta has a multi-asset class parametric risk model with total risk based on various risk factors;

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Graphical representation of UBS Delta variance-covariance matrix

UBS Delta's parametric risk model is a factor based variance covariance model. For fixed income and commodity curves, we use 3 risk factors per curve and for equities we use the PAS (Portfolio Analysis System) risk factors. Globally there are around 900 factors with the rest being asset specific risk. Our actual covariance matrix is unbounded and is a function of the number of curves in UBS Delta and their 3 factors.

It is a forward looking measure of risk, calibrated to historical data.

In order to assess portfolio risk, we need to:

- Capture and quantify curve dynamics of all risk factors (e.g. curves for fixed income)
- Assess portfolio's response to factor movements
- Combine the two into a risk measure: Portfolio Volatility
- From there, also derive Value-at-Risk and Tracking Error

Issuer-specific curves are UBS Delta's key building block for Fixed Income, around 5,000 are built daily. Distinguishing characteristics:

- Name-specific rather than rating categories
- Measure of credit quality allows for term structure
- Market driven (incorporates market expectations of up/downgrades)
- Non-parametric – determined at specific tenor points, with piecewise-linear interpolation.
- Government, LIBOR curves are just special cases of "issuer" curve
- Several years of history
- Not a 'best fit' curve - each bond is assigned an individual liquidity weighting

For fixed income:

- Three factors defined to explain changes in credit/rate curves
- Weekly changes in these factors are measured over 5yrs
- Recent data is favoured (exponentially weighted, half-life = 1yr)
- Calculation of statistical estimates of volatilities and correlations

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For of all issuer specific curves (plus swap and FX rates):

- Measure historical, weekly curve changes (by measuring changes of D1, D2, D3 of all curves)
- Regularly re-calculate statistical estimates of volatilities and correlations (database of "variance-covariance structure") - once per month
- Exponentially-weighted (recent events treated preferentially, halflife 1yr)

Since we build daily curves, we can look at how much of each factor each day's curve exhibits.

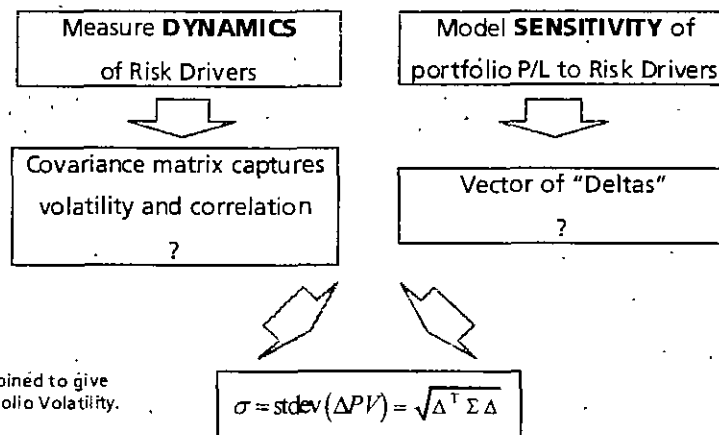
=> Gives us factor volatility

Note. These are Issuer Specific volatilities and correlations - not sector based (using sector curve data attributes the same level of risk to Ford as it does to Toyota)

Parametric Risk Model - Overview

UBS Delta's Parametric Risk tool is based on a 'Variance - Covariance' model

- Two key ingredients:



- From this also derive Value-at-Risk and Tracking Error

The total value-at-risk is divided into "**Curve**" (Fixed Income), "**Equity**", "**Commodity**" and "**FX**" factors. Curve is split further into (Credit) Spread, Interest Rate (split further into parallel and non-parallel) and Inflation factors. The reference curve is either LIBOR or Government according to user preference.

Users can also drill-down to see the value-at-risk by category (sector, rating, etc). The Spread VaR is determined by the volatility of the spread between the credit term structures of the issuers within the portfolio and the given Reference curve.

These numbers are not additive, since they represent issuer curve volatilities and issuer curves are likely to be less than 100% correlated.

The Total, Spread and Reference VaR numbers are given in the base currency of the portfolio and also as a percentage of the portfolio PV.

Portfolio volatility is calculated from our vector of portfolio sensitivities and matrix of curve dynamics via matrix multiplication. VaR is inferred from either a normal distribution assumption (various percentiles and time horizons), or adjusted with user-specified skewness, kurtosis. Tracking Error is computed using the active (i.e. portfolio relative to benchmark) positions rather than absolute ones.

VaR decomposition:

There are several ways to take a headline VaR number and break it down to indicate which parts of the portfolio are driving risks.

Factors – split out the risk in the portfolio from FX, Credit and Rates, Equity, Equity factors, Inflation and Commodity separately:

	VaR (USD)	Volatility (%)
Total	6,208,458	11.65%
Curve	584,043	1.10%
Spread	132,898	0.25%
Interest Rate	601,899	1.13%
Parallel	538,736	1.01%
Non-Parallel	110,205	0.21%
Inflation	0	0.00%
Equity	6,172,088	11.58%
Factor	2,787,025	5.23%
Market	2,843,740	4.86%
Sector	613,242	1.15%
Region	585,282	1.10%
Style	243,983	0.48%
Specific	5,508,985	10.33%
Commodity	168,148	0.32%
FX	194,484	0.36%

Sector – we show standalone volatility and volatility contributions. These are applied over a number of standard industry classifications, rating bands, plus support for user-defined asset and trade categories. Hence the user can identify risk by analyst classifications, at a trading desk-level, or even to a specific trading strategy.

	VaR (USD)	Tracking Error (bp)	TE Contribution (bp)	Marginal TE (bp) for USD 1,000,000	Beta vs Benchmark	Beta vs Sector	Category Selection TE (bp)	Security Selection TE (bp)
Total	4,587,364	126.4	126.4	0.0	0.90	0.90	161	119.7
Equity	87,900	2.4	-0.2	0.1	0.00	0.00	2.4	0.0
Equity Factor	647,820	17.8	13.5	-0.1	0.97	1.23	16.3	25.8
Equity Specific	68,817	1.9	0.1	-0.2	0.00	0.00	1.9	0.0
Commodity	476,931	13.1	3.7	0.0	1.28	1.39	4.3	25.7
Consumer Cycle	1,883,931	51.9	36.6	0.0	0.70	0.68	27.6	43.0
Consumer Non Cycle	480,919	-13.3	8.1	0.0	0.61	0.76	1.8	13.4
Fixed Income	736,412	20.3	6.5	-0.4	1.24	1.05	0.1	20.2
Fixed Income Specific	535,120	14.7	8.6	0.5	0.91	1.25	2.7	11.0

Note:
This is an example of 'Risk Attribution' – splitting risk metrics according to the generator of the risk – sectoral weightings or security selection
See "other notes" at the end of Section III for more details

Sharpe Ratio

UBS Delta calculates Sharpe Ratios for portfolios in VaR risk page. The Sharpe Ratio is the risk-adjusted return i.e. the return per unit volatility. For the relative case, it is defined as the relative return per unit Tracking Error.

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	VaR (USD)	Volatility (%)	Beta Portfolio	Rolldown Return 3M	Sharpe Ratio	Volatility Contribution (%)
Total	9,886,794	5.50%	1.00	6.72%	1.22	5.50%
Curve	9,886,794	5.50%	1.00	6.72%	1.22	5.50%
Spread	10,886,847	5.94%	1.00	--	--	3.80%
Interest Rate	0,140,859	5.04%	1.00	--	--	1.00%
Parallel	6,070,114	4.40%	1.00	--	--	1.00%
Non-Parallel	1,894,123	1.05%	1.00	--	--	0.24%
Inflation	0	0.00%	1.00	--	0.00	0.00%

Option Adjusted Spread

For bonds with optionality (e.g. callables) UBS Delta calculates the margin/spread of these bonds as the Option Adjusted Spread. In the calculation of OAS, UBS Delta assumes a Black-Derman-Toy tree of interest rates centred at the current swap curve with swaption volatilities. The OAS is a parallel shift of this tree that prices the bond to its market value.

Modelling and use of issuer-specific risk curves:

UBS Delta's risk model is a factor based variance covariance model. For fixed income and commodity curves, we use 3 risk factors per curve and for equities we use the PAS (Portfolio Analysis System) risk factors. Globally there are around 900 factors with the rest being asset specific risk. Our actual covariance matrix is unbounded and is a function of the number of curves in UBS Delta and their 3 factors.

It is a forward looking measure of risk, calibrated to historical data.

In order to assess portfolio risk, we need to:

- Capture and quantify curve dynamics of all risk factors (e.g. curves for fixed income)
- Assess portfolio's response to factor movements
- Combine the two into a risk measure: Portfolio Volatility

The parametric VaR tool allows for selection of horizon and for the confidence interval required. The 'risk free' or base curve can be toggled between government and libor. Additionally, the user can select to see top-level VaR only, view all factor drivers or view a single factor driver.

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Calculation Options

Category1: [Dropdown]

Category2: [Dropdown]

Rescale Benchmark:

Advanced Options: [Dropdown]

Calculate

Select from the various measures available in the dropdown menus.

Display Options

Risk Factor: [Total] [Libor]

Horizon: [1 year]

Confidence: [95%]

95%
90%
84% (vol)

1 year
3 months
1 month
2 weeks
1 week
3 days
1 day

All
Total Portfolio VaR
Curve
Spread
Interest Rate
Parallel
Non-Parallel
Inflation
FX

Libor
Government

The user specifies a confidence level so that, e.g., with a 95% confidence level, a loss exceeding the Total VaR number would occur over the given horizon with 5% probability.

Additional advanced VaR options:

Calculation Options

Category1: UBS Broad Sector

Category2: [Dropdown]

Rescale Benchmark:

<< Hide

Marginal Funding: New money Existing cash

Scaling by: PV Nominal

Duration Adjustment: [None]

Asset Sector Betas:

Calculate

In Marginal Funding, you can select whether the marginal trade is simulated from an injection of cash or is done by rebalancing the cash account. The default is cash injection

Using PV to express percentage volatility is not always appropriate, especially where there are derivatives in the portfolio. Nominal Scaling will report volatility in percentage of the absolute sum of Nominal, and also scale the benchmark to have same Nominal as the portfolio.

Asset Sector Betas are betas for assets relative to the benchmark holdings in that sector, rather than the total benchmark. For example, you may wish to see if Ford is a high-beta or low-beta stock relative to the market as a whole (ie the benchmark), or just to the Autos sector. Checking this option will significantly slow the risk calculation.

A major component of Tracking Error, and especially Beta, comes from the "gearing" effect of being long or short in duration vs the benchmark. Duration Adjusted VaR shows what the risk would be with that effect stripped out. The portfolio and benchmark are compared in such a way that PV and either CDD1 (Credit) or LDD1 (Libor) are matched simultaneously. The main differences are generally seen in the Beta numbers, and in TE Attribution

Decay factor

The variance covariance matrix is calibrated using rolling weekly returns over 5 years of history, with an exponential weighting. The decay factor for the exponential weighting is in mathematical terms a lambda of ~0.97, which equates to a half-life of one year. This results in a progressive time weighting towards recent history. Roughly speaking the preceding 12 months has double the weighting of the year before that, and so on.

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Given there is only one active covariance matrix for the parametric risk model, it is not currently possible to give a choice of decay factor. However the Historical VaR tool allows full flexibility to change horizon, historical dates to sample, confidence interval and half life (decay factor).

Historical VaR

Settings

P&L Horizon: 7 (Days)

Start Date: 23 Mar 2008

End Date: 23 Mar 2009

Confidence Level: 95

Breakout Type: Asset Class

Benchmark: LIABILITY Rescale

Factor Breakout: All

Half Life: (Years)

Use Trade Date FX:

UBS Delta can split risk (as measured using Tracking Error(TE), VaR or volatility, marginal TE-or volatility) into both systematic (based on model factors – spread, interest rates, equities, FX and commodities) and also into any category (idiosyncratic risk) desired by the user. We predefine various categories such as iBoxx sectors, country, currency, credit rating and asset class, but also allow the client to upload any category alongside an asset or trade.

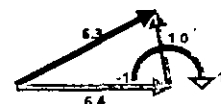
Risk Factor: All Libor

Portfolio

	VaR (USD)	Volatility (%)
Total	6,208,458	11.65%
Curve	584,043	1.10%
Spread	132,898	0.25%
Interest Rate	601,899	1.13%
Parallel	536,736	1.01%
Non-Parallel	110,205	0.21%
Inflation	0	0.00%
Equity	6,172,066	11.58%
Factor	2,787,025	5.23%
Market	2,643,740	4.86%
Sector	813,242	1.45%
Region	585,282	1.10%
Style	243,983	0.40%
Specific	5,506,985	10.33%
Commodity	188,140	0.32%
FX	104,484	0.36%

UBS Delta's Parametric Risk model enables portfolio risk to be decomposed into independent risk drivers, e.g. Credit/Spread, Interest Rates (choose government or libor as the reference), Inflation & FX

$$\sigma_{Total}^2 = \sigma_L^2 + \sigma_S^2 + 2 \underbrace{\rho(\text{Spread}, \text{Rates})}_{\text{diversification}} \sigma_L \sigma_S$$



Diversification means that the total portfolio risk is less than the expected sum of the factors

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Fixed income risk is based on attaching to each asset a yield curve that drives the daily changes in the value of the asset. Typically these are specific to issuer, currency and seniority level (for example FRTEL senior curve in EUR). The curves are calibrated to market prices every day and the changes in level, slope and curvature of the curve are recorded. The risk is then decomposed in terms of

- parallel moves in libor or government curve
- non-parallel moves in libor or government curve
- moves (parallel and non-parallel) in the spread curve (to libor or government)
- moves (parallel and non-parallel) in inflation curve (for index linked assets)

Equity risk is decomposed into:

- o **Market factor**
- o **Sector factors:**
 - Oil & Gas
 - Consumer Services
 - Basic Materials
 - Telecommunications
 - Industrials
 - Utilities
 - Consumer Goods
 - Financials
 - Health Care
 - Technology
- o **Country factors:**
 - Canada
 - EMU
 - UK
 - Europe ex EMU UK
 - Japan
 - Asia Pacific ex Japan
 - United States
 - Latin America
- o **Style factors:**
 - Growth
 - High Dividend Cover
 - Value
 - Medium Market Cap
 - High Price Momentum
 - High Freecashflow Yield

Robust regression is used to determine betas to these factors. They are calculated monthly and it is not possible at present to view historical beta values.

1b) Risk Model - Historical VaR

The UBS Delta Historical VaR tool allows for flexible simulation of results over custom time periods. There is no assumption about return distributions, instead observing historical returns of the assets held in the portfolio on the valuation date selected. This can also be used to 'stress' test a portfolio under different extreme market conditions.

The parametric VaR model is calibrated using weekly asset returns over 5 years of history, exponentially weighted with a 1 year half-life (Lambda = 0.97).

That history should be sufficient to calibrate the parametric VaR for reasonably long periods – UBS Delta parametric risk allows for (time-scaled) horizons between 1 day and 1 year. The output for the horizons given is scaled from the weekly-calibrated data using the square root of time.

Use Historical VaR for custom horizons

Historical VaR allows for fully customisable horizon (asset return window), however the efficacy of this is largely a function of the length of history

The screenshot shows the 'Historical VaR' tool interface with the following settings:

- Display Options:** Risk Factor: Total, Libor
- Horizon:** 1 year
- Confidence:** 1 year (dropdown menu open showing 6 months, 3 months, 1 month, 2 weeks, 1 week)
- Covariance:** (checkbox)
- Historical VaR:** (checkbox)
- Settings:**
 - P&L Horizon: 250 (Days)
 - Start Date: 23 Mar 2000
 - End Date: 23 Mar 2009
 - Confidence Level: 95
 - Breakouts Type: Asset Class
 - Benchmark: None (Rescale checkbox)
 - Factor Breakout: All
 - Half Life: (Years)

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available – and therefore the degrees of freedom in the dynamic VCV matrix calibration.

The rolling window used to calculate volatility makes a significant difference. Over the same start-end time series different horizons will generate markedly different volatilities. This can be approximated by using square root scaling, but this is an approximation and does not really address the white noise apparent in daily return data. This white noise is not eradicated by switching to a longer period, but it is minimised. In general we would recommend using the window you intend to report on upfront, rather than do daily runs and scale.

Actual numeric example of different period vols (not sqrt-time-scaled)

E.g. FTSE 100 Index (non-overlapping) - Annual vol equivalence:

Daily vol (360 days) = 37.3

Weekly vol = 36.0

Monthly vol = 21.9

In a very broad generalisation, higher frequency = increased vol.

Question: What would happen to my portfolio today if market conditions from certain period of history were to repeat?

- o Value each asset in portfolio with historical market data for each day:
 - o Fixed Income: 1-factor linear approximation based on curve movements:

$$PV_t = PV_0 + \sum_i \frac{\partial PV}{\partial f^i} (f_t^i - f_0^i)$$

- o Equity: Take historical returns and valuation date PV:

$$PV_t = PV_0 \frac{\text{price}_t}{\text{price}_{start}}$$

- o Aggregate to create portfolio pv series
- o Create difference (P&L) series:

$$\Delta PV_t = PV_{t+h} - PV_t$$

- o Order by P&L and find the confidence cut-off (VaR)
- o Average losses greater than VaR (CVaR)
- o Generate volatility, skew and kurtosis numbers

HVaR output:

VaR contributions = P&L breakout on the "VaR day"

Conditional VaR/Expected Loss (CVaR/ELoss) = breakout of average P&L larger than VaR

- o More stable and informative than VaR contributions

Vol contributions (CVol) = same method as in parametric model

All these risk contributions are applications of Euler's theorem for homogeneity degree n functions.

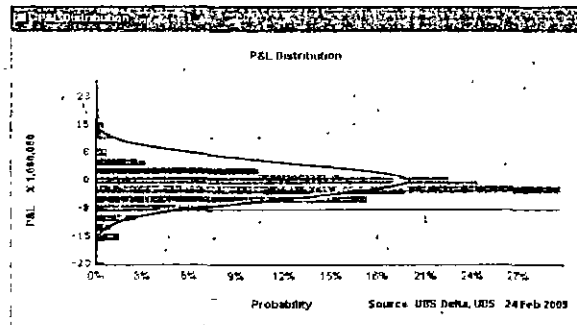
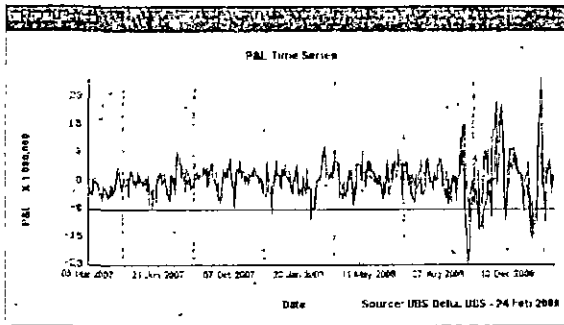
$$f(\lambda x_i) = \lambda^n f(x_i) \implies \sum_i x_i \frac{\partial f}{\partial x_i} = n f$$

Notes:

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VaR, CVar, Mean, CVol contributions are additive
Vol, Skewness and Kurtosis are calculated for P&L series of sectors and are not additive
Gaussian line in histogram: normal(mean, vol).

P&L Horizon: 7
Start Date: 24 Feb 2007
End Date: 24 Feb 2009
Confidence Level: 95



HVaR results include VaR and CVaR (Conditional VaR), skew and kurtosis so that the degree of 'fat-tails' and non-normality can be visualised

HVaR is defined by the threshold of the 5% highest losses – shown here for a weekly horizon, so scale up by SQRT(52) for annual (= GBP 59.5m)

Eloss (Expected Shortfall) is defined by the average of the 5% worst days

Skewness measures the data set's lack of symmetry relative to normal distribution

Kurtosis is a measure of whether the data set is peaked or flat relative to a normal distribution

Sector	VaR	Eloss	Vol	CVol	Mean	Skewness	Kurtosis
Total	8,253,279.57	12,645,069.70	5,037,555.85	5,037,555.85	295,628.29	0.02	4.95
Financials	144,545.49	-435,978.98	401,084.36	175,963.93	34,842.98	-0.15	1.34
Utilities	-627,372.06	-2,034,161.65	1,026,216.40	787,419.62	-42,895.85	-0.17	1.75
Sovereign, Supra, Regional	-843,591.11	-617,722.14	251,045.84	200,403.50	-26,235.27	-0.39	2.77
Industrials	522,072.63	-1,179,829.44	624,134.31	469,074.60	-16,067.92	-0.32	3.75
Telecoms, Media, Advertising	985,955.25	-985,899.17	642,254.53	368,661.25	-12,182.88	-0.39	3.80
Property	3,867.33	-8,292.99	5,579.57	3,009.72	-849.12	-0.41	2.41
Not Classified	8,030,891.56	-7,392,668.23	3,419,389.50	3,035,797.26	146,459.18	0.81	5.73
	5,555,687.00	-9,847,237.20	4,635,650.94	4,635,650.94	253,041.50	0.64	4.06

VaR Contributions are the category's P&L breakout on the particular "VaR day"

Eloss Contributions are the breakout of average P&L larger than VaR

CVol Contributions are the dependent contributions that sum to the portfolio total Volatility and tell us to what extent the category contributes to volatility

2) Risk indices

A big number of risk indices/analytcs is available on UBS Delta:

Absolute risk indices:

- VaR
- Volatility
- Risk contributions

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- Marginal risks
- Expected loss

Relative risk indices:

- TE
- TE contribution
- Marginal TE
- Category selection TE
- Security selection TE

Marginal volatility gives the incremental risk contributions i.e. the change in the portfolio volatility in basis points given an increase in the allocation to the category/sector/issue of a given PV amount in the portfolio's base currency. The reference PV is adjusted up or down from 1,000,000, if necessary, to suit the market value of the portfolio being analysed.

The risk contributions are the diversified or dependent contributions to risk – these are additive and derived by multiplying the marginals by the position PV. As such via the contributions (per category/sector/issue basis) express the proportional contribution of each slice to the overall risk, taking into account the diversification of the rest of the portfolio on the particular slice.

UBS Delta can calculate Marginal contribution to VaR (or other risk measures like TE) from a risk category – sector, rating, issuer or user defined categories.

We have a 'Marginal Volatility' column in the VaR/Tracking Error analysis that shows the change in the portfolio volatility in basis points given an increase in the allocation to the category/sector/issue of a given PV amount in the portfolio's base currency.

Contribution to risk and marginal risk example:

	VaR (GBP)	Volatility (%)	Volatility Contribution (%)	Marginal Vol (bp) for GBP 1,000,000
Overall Total	53,226,235	12.80%	12.80%	3.0
UBS Group Sector				
Energy	4,631,728	1.11%	0.70%	1.5
Materials	6,740,946	1.82%	1.28%	2.4
Not Classified	31,335,906	7.53%	6.58%	14.3
Property	69,331	0.02%	0.01%	1.4
Equities, Struct. Finance	2,746,069	0.66%	0.45%	2.0
Telecom, Media, Advertising	6,172,440	1.48%	1.12%	2.4
Utilities	13,026,678	3.13%	2.67%	3.0

The Not Classified holdings (IR & Inflation swaps) contribute to 6.58% of the total portfolio volatility (12.8%)

If an additional GBP 1m PV of utilities were bought, the portfolio's volatility would increase by 3bps, and vice-versa

The reference PV is adjusted up or down from 1,000,000 (the size of marginal is scaled according to portfolio size), if necessary, to suit the market value of the portfolio being analysed. The scenario amount is always chosen by the system such that it is approximately 1% of the total portfolio nominal. An example is shown below which shows the largest Marginal TE coming from the Energy sector with a marginal TE of 0.5bps.

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Relative	VaR (USD)	Tracking Error (bp)	TE Contribution (bp)	Marginal TE (bp) for USD 1,000,000	Beta vs Benchmark	Beta vs Sector	Category Selection TE (bp)	Security Selection TE (bp)
Overall Total	4,587,364	126.4	126.4	0.0	0.90	0.90	16.1	119.7
UBS US Intermediate Sector								
Bonds Total	87,900	2.4	-0.2	0.1	0.00	0.00	2.4	0.0
Basic Industry Total	647,620	17.8	13.5	-0.1	0.97	1.23	16.3	25.8
Brokers Total	68,817	1.9	0.1	-0.2	0.00	0.00	1.9	0.0
Capital Goods Total	476,931	13.1	3.7	0.0	1.28	1.39	4.3	25.7
Consumer Cyclical Total	1,883,931	51.9	36.6	0.0	0.70	0.68	27.6	43.0
Consumer Non-Cyclical Total	480,919	13.3	8.1	0.0	0.61	0.76	1.8	13.4
Electric Total	736,412	20.3	6.5	-0.4	1.24	1.05	0.1	20.2
Energy Total	535,120	14.7	8.6	0.5	0.91	1.25	2.7	11.0

The diversification benefit means contributions are generally smaller than standalone risk. By looking at both risk marginals and contributions and entering trades in UBS Delta before they are actually executed you can manage the risk on a category/sector/issue basis in your portfolio. This will allow you to abide by pre-set risk limits.

UBS Delta is able to calculate shortfall/under-funding probability. The VaR tool estimates the maximum expected loss over a given horizon for a selected portfolio. VaR is calculated assuming a zero-mean normal distribution of portfolio returns. The width of this distribution (hence the 5% probability point) is determined by the volatility (from the UBS Delta risk model) of portfolio returns.

Clients are able to input a time horizon (1 day, 3 days, 1 week, 2 weeks, 1 month, 3 months and 1 year), a confidence interval (84% (volatility), 95%, 99% and 99.5%) and a shortfall level (an implied under-funding level). By changing anyone of these variables you can get the probability of under-funding below. The example below is based on a portfolio with a PV of \$426.1mm, a 1 year time horizon and a 95% confidence level. This results in a shortfall (under-funding) of \$18.4mm. You are also able to see factor volatility contributions in UBS Delta – in this example the volatility contribution from Spread is -0.27%.

Probability	VaR (USD)	Volatility (%)	Beta vs Portfolio	Roll-down Return %	Sharpe Ratio	Volatility Contribution (%)
Total	18,409,064	2.63%	1.00	5.80%	2.13	2.63%
Curve	18,409,064	2.63%	1.00	0.00%	2.13	2.63%
Spread	5,408,820	0.77%	1.00	-	-	-0.27%
Interest Rate	20,830,411	2.86%	1.00	-	-	2.86%
Parallel	10,182,205	2.74%	1.00	-	-	2.89%
Non-Parallel	2,322,045	0.33%	1.00	-	-	0.25%
Inflation	0	0.00%	1.00	-	0.00	0.00%

Display Options

Risk Factor:

Horizon:

Confidence:

Shortfall: Probability:

For any portfolio with a given benchmark, the tracking error is essentially the volatility of the portfolio relative to the benchmark. If the portfolio returns R_p and the benchmark R_b then the tracking error is defined by:

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$$\sigma(r_p - r_B)$$

i.e. the standard deviation of the return relative to the benchmark. Tracking error is also referred to as active risk.

The standard deviation may be estimated either historically (ex post returns) or from a forward-looking risk model (ex ante returns). The UBS-Delta approach to risk is based upon a 3-factor model of credit term structures; this model is used directly in the estimation of portfolio volatility and tracking error.

Throughout UBS Delta volatility and tracking error are reported in annualised percentage terms. If, e.g., the volatilities and correlations of the risk factors are computed weekly, then the reported volatility is scaled by a factor of $\sqrt{52}$.

If no benchmark is defined, then the tracking error is the portfolio volatility.

Where the PV of the benchmark is scaled to match the portfolio PV, the tracking error is equivalent to the volatility of the active or relative position as a percentage of the portfolio value:

$$\frac{\sigma(\Delta PV_R)}{PV}$$

All risk indices can be provided on portfolio/BM level and then broken out by sub-categories such as asset class, currency, sector, rating class etc. In addition, the analytics can be shown by risk factor. This easily allows to identify risk concentrations, the degree of diversification, marginal risks and risk contributions as well as indicates how much active risk is taken by a portfolio manager.

3) Stress test analysis

UBS Delta allows for sophisticated stress testing. Stress scenarios can be defined and stored on the system. This can be deterministic isolated or joint scenarios, i.e. the user can see the impact of combined and isolated stresses.

The stress reports show the impact of changing markets on the PV and risk numbers (sensitivities) of a portfolio.

The following factors can be stressed:

- interest rates (parallel and non-parallel)
- spreads (parallel and non-parallel)
- interest rate vol
- Equities
- Equity vol
- FX
- Inflation

All stress can be applied to the overall portfolio or subcategories such as specific currencies etc only.

Complex stress tests may be defined in a variety of ways:

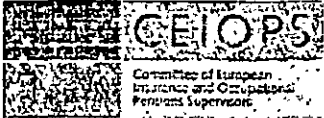
- Additive or multiplicative scenario inputs
- Global, specific tenor or custom profile shocks

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Results available via automated reporting

Example:



QIS4 Technical Specifications
CEIOPS-DOC-23/07

Committee of European Insurance and Occupational Pensions Supervisors

Calculation
TS.IX.B.4
The capital charge for interest rate risk is determined as the result of a pre-defined scenario:

$$Mkt_{int}^{up} = \max \begin{cases} 0 \\ \Delta NAV | \text{upward shock} \end{cases}$$


$$Mkt_{int}^{down} = \max \begin{cases} 0 \\ \Delta NAV | \text{downward shock} \end{cases}$$

where $\Delta NAV | \text{upward shock}$ and $\Delta NAV | \text{downward shock}$ are the changes in the net value of asset and liabilities due to re-valuing all interest rate sensitive instruments using altered term structures.³⁰

TS.IX.B.5
The altered term structures are derived by multiplying the current interest rate curve by $(1+s^u)$ and $(1+s^{down})$, where both the up stress $s^u(t)$ and the down stress $s^{down}(t)$ for individual maturities t are specified as follows:

Maturity t (years)	1	2	3	4	5	6	7	8	9	10	12	15	20+
relative change $s^u(t)$	0.94	0.77	0.69	0.62	0.56	0.52	0.49	0.46	0.44	0.42	0.42	0.42	0.37
relative change $s^{down}(t)$	-0.51	-0.47	-0.44	-0.42	-0.40	-0.38	-0.37	-0.35	-0.34	-0.34	-0.34	-0.34	-0.31

Scenario Analysis Engine



Scenario Results - Change in PV (EUR '000s)														
UBS Sector	Total	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y	10Y	12Y	15Y	20Y
Financials	-65,755	-5,066	-3,588	-3,868	-4,642	-2,997	-3,106	-4,880	-3,014	-3,963	-5,980	-6,408	-11,166	-7,460
Industrial	-21,339	-1,701	-605	-811	-865	-2,030	-1,555	-1,511	-911	-899	-2,247	-2,365	-2,280	-3,783
Property	-14,268	-738	-814	-496	-463	-549	-702	-1,029	-595	-648	-2,206	-1,652	-2,781	-1,927
Sovereign	-67,101	-3,550	-2,596	-3,354	-2,258	-3,678	-2,050	-3,478	-3,617	-2,405	-3,239	-8,640	-7,427	-21,106
Telecoms	-4,754	-227	-137	-362	-490	-185	-211	-213	-210	-194	-880	-1,120	-189	-423
Utilities	-27,402	-1,445	-794	-1,294	-1,074	-1,582	-1,594	-1,110	-1,495	-1,192	-3,116	-1,878	-6,063	-3,393

Finally, "What if scenarios" are possible. "What-if" risk evaluations can be undertaken by loading portfolios into tactical what-if child portfolios. In this way, prospective trades do not hit production data and before/after comparisons can be easily undertaken.

Example upload of parent-child portfolios:

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AssetType	Portfolio	Description	BaseCurrency	Type	FolderName
PRT	BOND_BM	Bond benchmark	EUR	B	DEMO
PRT	EQUITY_BM	Equity benchmark	EUR	B	DEMO
PRT	iTraxx105Y	iTraxx S10 5Y	EUR	B	DEMO
PRT	CrossAsset	Cross asset portfolio	EUR	P	DEMO
PRT	CDIBespoke	CDI Bespoke Pool	EUR	P	DEMO
PRT	ABS	Asset Backed Securities	EUR	P	DEMO
PRT	FUND	Funds	GBP	P	DEMO
PRT	STRATEGY	Trade Strategies	EUR	P	DEMO

AssetType	Portfolio	Description	BaseCurrency	Type	FolderName	Benchmark
PRT	BOND_PF	Bond portfolio	EUR	P	DEMO	BOND_BM
PRT	EQUITY_PF	Equity portfolio	EUR	P	DEMO	EQUITY_BM
PRT	CDSBespoke	CDS Bespoke Pool	EUR	P	DEMO	iTraxx105Y

AssetType	Portfolio	Description	BaseCurrency	Type	FolderName
PRT	BOND_BM	Bond benchmark	EUR	B	DEMO
PRT	EQUITY_BM	Equity benchmark	EUR	B	DEMO
PRT	iTraxx105Y	iTraxx S10 5Y	EUR	B	DEMO

AssetType	ParentName	ChildName
PLN	CrossAsset	ABS
PLN	CrossAsset	FUND
PLN	CrossAsset	iTraxx105Y

Using the AssetType PLN, you can link parent and child portfolios. In this example - ABS, FUND and iTraxx105Y - all 3 become children of CrossAsset.

PRT - this function allows you to define portfolios and benchmarks via uploads. You can also put the portfolios into a specific folder as shown above.

4.) Backtesting of strategies

All calculations can be done setting historical dates (in addition to the current date)

2.2.4 Absolute and relative performance measurement and risk analysis

Whenever a benchmark is linked to a portfolio in UBS Delta, all risk calculations will calculate absolute portfolio, absolute benchmark and relative VaR. See screenshot below.

Portfolio	VaR (GBP)	Volatility (%)
Total	53,226,235	12.80%

Portfolio	VaR (GBP)	Tracking Error (bp)
Total	28,723,799	690.7

Benchmark	VaR (GBP)	Volatility (%)
Total	59,458,459	12.06%

UBS Delta can split VaR into different sources of risk by any pre-populated or user-supplied category.

Since we have factor drivers down which can be disaggregated to the cashflow level, any aggregation can be made – at asset level, by strategy or by collections of cashflows.

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Pre-defined categories include:

- o Sectors (UBS, IBOXX, S&P)
- o Ratings (Moody's, S&P, composite)
- o Currency, Domicile, Seniority
- o Asset Class, Issuer and Issue

Any user-defined categories, e.g. desk or strategy level, can be populated via manual or automated uploads, or directly in the website

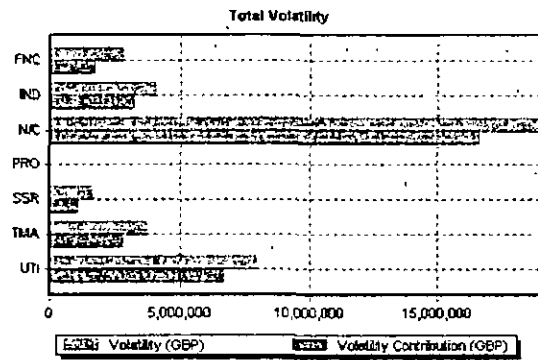
VaR is the cash VaR in that sector; and volatility the % of total portfolio PV

- o Risk numbers are calculated on each slice of the portfolio independently of the rest of the portfolio
- o The components are not additive

For example, UBS Broad Sector split.

Category	VaR (GBP)	Volatility (%)
Current	53,226,235	12.80%
Total		
UBS Broad Sector Breakdown		
Equities	4,631,728	1.11%
Fixed Income	6,740,946	1.62%
Total	31,335,906	7.53%
Property	69,331	0.02%
Total	2,746,069	0.66%
Commodities	6,172,440	1.48%
Total	13,026,678	3.13%

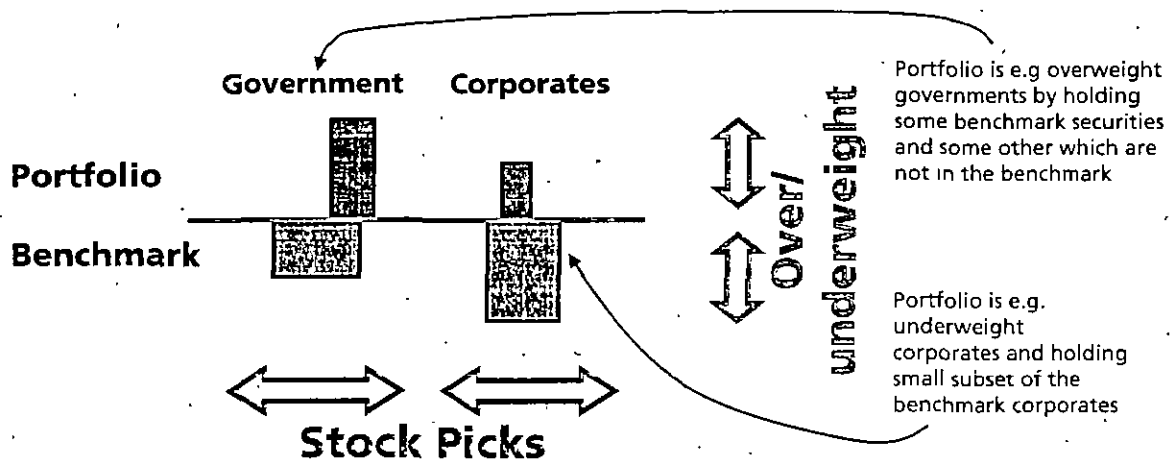
The Utilities sector has an independent volatility of 3.13%, as a percentage of total portfolio PV



Source: UBS Delta, UBS

Risk Attribution: Quantifying risk generation due to sector and security allocation decisions

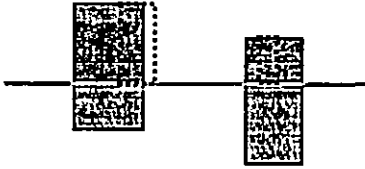
- o How much risk comes from holding different weights from the benchmark in each category (e.g. sector)?
- o How risk comes from holding different securities from the benchmark in each category (e.g. sector)?



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- ◆ Attribute to Category Selection
 - Assuming imaginary portfolio with "active" weights and "passive" security selection



- ◆ Attribute to Security Selection:
 - Assuming imaginary portfolio with "active" security selection and "passive" weights



Example risk attribution output:

	Val (USD)	Tracking Error (bp)	TE Contribution (bp)	Marginal TE (bp) / %	Beta vs Benchmark	Beta vs Sector	Category Selection TE (bp)	Security Selection TE (bp)
Total	4,587,354	126.4	126.4	0.0	0.90	0.90	16.1	119.7
UBS US Intermidiate Sector								
Banks	87,900	2.4	-0.2	0.1	0.00	0.00	2.4	0.0
Bank Industry	647,620	17.8	13.5	-0.1	0.97	1.23	16.3	25.8
CRISMA	68,817	1.9	0.1	-0.2	0.00	0.00	1.9	0.0
Capital Goods	476,831	13.1	3.7	0.0	1.28	1.39	4.3	25.7
Consumer Cyclical	1,883,931	51.9	36.6	0.0	0.70	0.68	27.6	43.0
Consumer Non-Cyclical	480,919	13.3	8.1	0.0	0.61	0.76	1.8	13.4
Energy	736,412	20.3	6.5	-0.4	1.24	1.05	0.1	20.2
Financial	535,120	14.7	8.6	0.5	0.91	1.25	2.7	11.0

Similarly for performance calculations. We allow for absolute and relative performance measures: performance based on returns and contributions for portfolio and benchmark as well as relative performance contributions and a performance attribution.

UBS Delta is able to provide performance attribution on a daily, monthly, quarterly, and/or annual basis. We use a time-weighted approach combined with the Dietz approximation to calculate returns over longer periods (E.g. in quarterly attribution we use Dietz in each quarter and link each quarter geometrically).

We also offer an AUTO (Menchero optimised) option where we split up the attribution period such that injections occur on split boundaries, giving a true time-weighted approach.

Attribution Settings		Settings	
Category 1	Asset Type	Attribution Division	Auto
Category 2		Interest Rate	Libor
Category 3		Returns	Percentage
Benchmark	BoxxCorp (B)	User defined FX rates	
From	25-DEC-2005	User defined EOD prices	
To	25-JAN-2006	Portfolio is an index	<input type="checkbox"/>
Portfolio Position Date		Benchmark is an index	<input checked="" type="checkbox"/>
Benchmark Position Date		Rescale benchmark	<input checked="" type="checkbox"/>
« Hide Settings	Saved Attributions...	Submit	
		Separate out:	
		Interest rate	<input type="checkbox"/>
		Interaction	<input type="checkbox"/>
		Trade price effect	<input type="checkbox"/>

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Supports:

- Multiple Asset Classes (cash bonds, credit & interest rate derivatives)
- Top-down and Bottom-up Analysis
- User-defined Customisation
- Thorough Analytics (Portfolio return/contribution by rates, spread, fx and carry)
- External Cashflows (Injections & Withdrawals)
- Multi-Pricing Flexibility
- Percentage or Monetary Returns

Category	Total	FX	Int. Rates	Spread	Carry	Total	FX	Int. Rates	Spread	Carry	Category	Security
Total	-65.61	-48.82	28.64	-46.62	7.49	-65.61	-48.82	28.64	-42.77	-1.16		
Emurc	-72.76	-30.13	0.00	-42.54	-0.06	-39.97	-12.33	-10.19	-73.23	0.00		
Venite	7.25	-17.28	20.64	1.92	2.57	60.52	16.90	3.87	40.90	-1.16		
Cash Account	0.00	0.00	0.00	0.00	0.00	-66.06	-52.59	26.96	-60.44	0.00		

Performance broken down into FX, Duration, Sector Weights & Name selection. All breakouts by any category – e.g. Asset Type

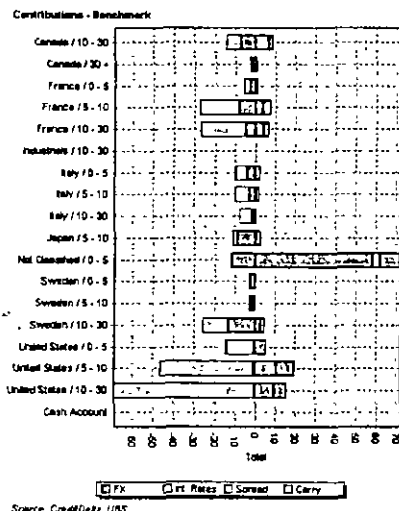
From	To	Portfolio Return (bp)	Benchmark Return (bp)	Portfolio Return (actual)	Benchmark Return (actual)	Portfolio PV (Start)	Portfolio PV (End)	Portfolio Cash (End)	Benchmark PV (Start)	Benchmark PV (End)	Benchmark Cash (End)
7-Nov-2006	8-Nov-2006	41.84	3.50	368,516.31	31,629.97	87,869,457.77	86,237,976.08	-84,326,266.28	87,869,457.77	87,801,087.74	0.00
8-Nov-2006	9-Nov-2006	-45.96	-14.59	-405,552.20	-128,243.00	88,237,976.08	87,832,423.88	-166,985,362.38	87,901,087.74	87,777,844.75	0.00
9-Nov-2006	10-Nov-2006	-110.33	-38.03	-968,022.31	-333,763.00	87,832,423.88	86,863,401.57	-168,985,362.38	87,777,844.75	87,430,081.75	0.00

Users can supply their own traded prices, prices from index suppliers, or reporting categories

Equity performance attribution can be performed on a country, sector and industry basis. Attribution uses the Brinson-Fachler approach to calculate category and security attribution.

We can slice and dice the total contribution and attribution figures by any type of pre-defined and user defined characteristics. As such you can break down the total by country, as shown in the following test example:

Benchmark Contributions Returns Export to Excel

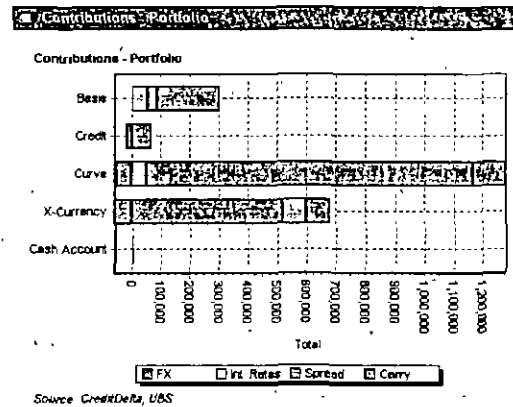
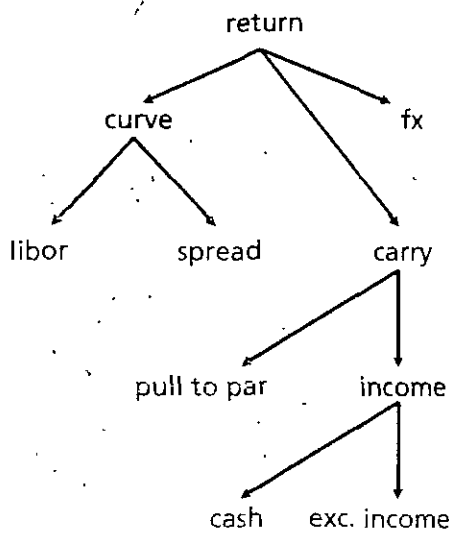


Category	Total	FX	Int. Rates	Spread	Carry
Total	-133.52	0.41	-212.95	47.49	31.61
Canada / 10-30	-5.48	-7.04	-7.51	6.85	2.22
Canada / 30+	-1.51	-1.19	-1.18	0.49	0.37
France / 0-5	-4.39	-2.61	-3.37	0.24	1.35
France / 5-10	-19.21	-7.84	-19.33	3.61	4.34
France / 10-30	-19.99	-5.01	-21.92	3.99	2.95
Industry / 10-30	0.00	0.00	0.00	0.00	0.00
Italy / 0-5	-7.03	-4.05	-5.37	-0.30	2.70
Italy / 5-10	-7.20	-2.65	-7.22	0.71	1.86
Italy / 10-30	-6.60	-1.19	-6.19	-0.14	0.92
Japan / 5-10	-8.45	-6.72	-2.40	0.65	2.02
Not Classified / 0-5	59.51	56.21	3.35	10.07	-12.12
Sweden / 0-5	-2.63	-2.67	-0.43	-0.02	0.49
Sweden / 5-10	-2.70	-1.32	-0.77	-0.83	0.22
Sweden / 10-30	-20.18	-12.95	-12.54	2.69	2.61
United States / 0-5	-8.77	-0.20	-13.05	-1.50	5.98
United States / 5-10	-26.52	-0.32	-46.38	11.01	9.17
United States / 10-30	-52.26	-0.04	-68.62	9.66	6.52
Cash Account	0.00	0.00	0.00	0.00	0.00

Currently equity contribution deals only with FX and income effects, it does not separate by other PAS equity-specific drivers such as style, country and sector. Note that this is not a separation by the PAS 'country' driver.

UBS Delta can perform fixed income attribution in regards to duration, yield curve, countries/regions, currencies, industries and sectors?

Fixed Income return model:



Category	Total	FX	Int. Rates	Spread	Carry
Total	2,206,721.92	468,916.85	189,371.78	1,157,792.93	394,691.16
Basis	306,504.75	0.00	55,726.36	32,105.66	217,672.70
Credit	50,102.27	0.00	782.92	88,494.33	-19,184.98
Curve	1,226,026.02	-50,849.37	50,000.11	1,113,036.04	115,837.24
X-Currency	624,088.88	517,765.42	81,652.37	-55,865.08	80,358.19
Cash Account	0.00	0.00	0.00	0.00	0.00

UBS Delta is able to analyse the currency effect in regards to an equity portfolio. The FX driver in the image above contains the FX-surprise and the compounded effect of the spot FX change and the return in the local currency.

The system is able to provide detailed attribution to various risk factors (e.g. size, value, growth, interest rate sensitivity, etc)

We currently separate the following drivers: FX, interest rates (parallel, non-parallel), spread and time/carry (which is decomposed into income and pull to par effect; for equities there is no pull to par and the time effect is purely made up of income).

UBS Delta can provide fixed income and equity analysis in, up/down markets. The system does not differentiate between up/down markets and is used in both scenarios.

Our relative performance and risk breakdown reports allow to explain exposures and effects of decisions contributing to the result in the given portfolio. We clearly show the factors accounting for these differences – and any report can be run for a historical date: Especially, FX effects can be separated out, hedged vs non-hedged absolute and relative to the benchmark can be shown:

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2.2.5 Reporting

UBS Delta offers a number of standard reports designed to provide an overview of key portfolio risk analytics and performance measures. In addition to these, UBS Delta is also able to offer customised reporting. Upon users' requests, UBS Delta is able to build in graphics, logic based statements and branding requirements. Any analytical output available online through UBS Delta can be replicated through reporting.

All reports are generated in excel csv or database friendly xml formats. Delivery takes place automatically based on a pre-agreed schedule through emails or SFTP. UBS Delta retains archives of each report sent for compliance reasons so could retrieve any report on request. Once the report definitions have been set up, adding further portfolios to the schedule is trivial.

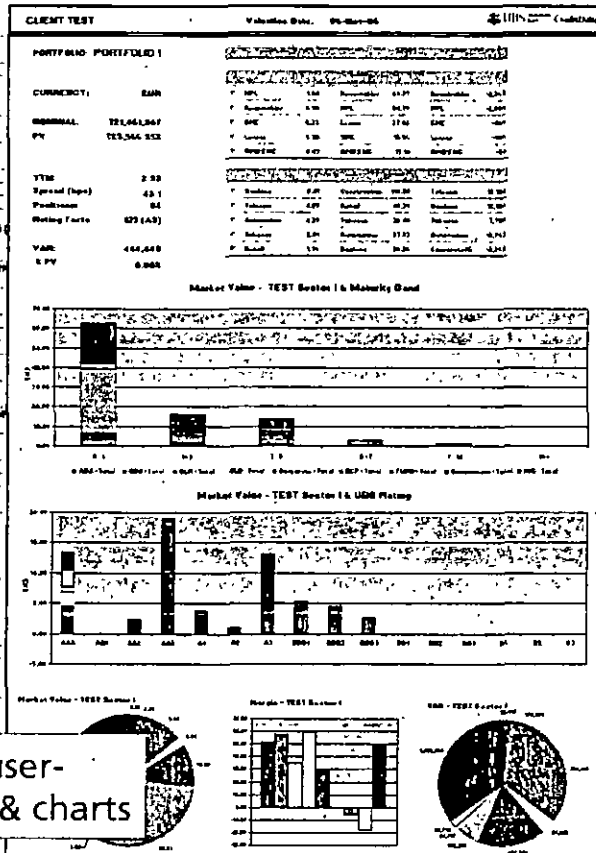
A further feature of UBS Delta, is the ability to export any output obtained online directly into an excel format.

Reports can be run as batch reports automatically in the background, they can be scheduled and are delivered at pre-agreed times.

Example UBS Delta reports:

	A	B	C	D
1	TEST / Part			
2	06 November 2008			
3				
4				
5				
6	Portfolio Details	PORTFOLIO 1	PORTFOLIO 2	PORTFOLIO 3
7	Portfolio	PORTFOLIO 1	PORTFOLIO 2	PORTFOLIO 3
8	Contract			
9				
10	Portfolio Summary	PORTFOLIO 1	PORTFOLIO 2	PORTFOLIO 3
11	Portfolio	PORTFOLIO 1	PORTFOLIO 2	PORTFOLIO 3
12	Currency	EUR	EUR	EUR
13	Notional	72,441,847	98,973,525	265,979,823
14	BM Notional			
15	PV	72,356,352	98,871,611	265,975,879
16	Discounted PV			
17	Mod Duration	0.30	0.25	0.61
18	BM Mod Duration			
19	Outgoing Rates			
20	Maturity Duration			
21	BM Maturity Duration			
22	Convexity			
23	BM Convexity			
24	YTM			
25	BM YTM			
26	Income Yield			
27	BM Income Yield			
28	3m Follow-on Return			
29	BM 3m Follow-on Return			
30	Spread (bps)			
31	BM Spread (bps)			
32	Z-Spread			
33	BM Z-Spread			
34	Positions			
35	BM Positions			
36	Rating Factor			
37	BM Rating Factor			
38				
39				
40	PV Breakdown - TEST Sector 1			
41	ABS			
42	CDO			
43	CM			
44	CLO			
45	Corporate			
46	ECF			
47	FLIND			
48	Government			
49	MFC			
50				
51	PV Breakdown - TEST Sector 2			
52	70% Sen (50% Met)			
53	80% ABS/20% CDO			
54	80% Sen (50% ABS)			
55	80% Sen (50% Met)			
56	80% Sen (50% Met)			
57	80% Sen (50% Met)			
58	80% Sen (50% Met)			
59	ABS			
60	Autos			
61	Auto Loans			
62	Automotive			
63	Banking			
64	Bank Materials			
65	CDO			
66	CDO 2			
67	CMBS			
68	Commercial			
69	Commercial ABS			
70	Construction			
71	Consumer ABS			
72	Corporate			

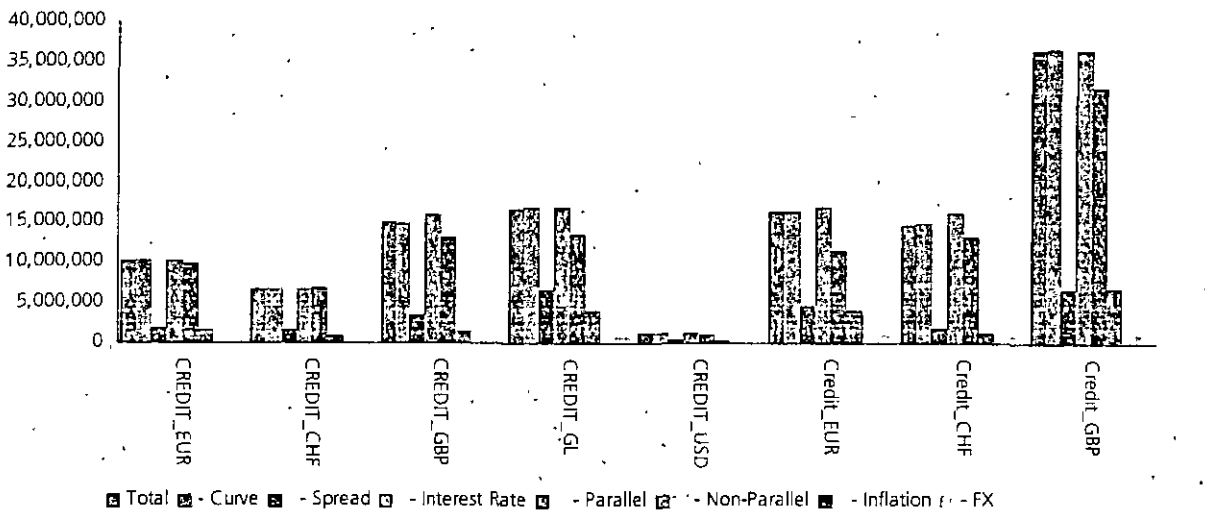
Excel data reports for multiple portfolios.



Pull data into user-defined tables & charts

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Portfolio	CREDIT_EUR	CREDIT_CHF	CREDIT_GBP	CREDIT_GL	CREDIT_USD	Credit_EUR	Credit_CHF	Credit_GBP
Summary	CREDIT_EUR	CREDIT_CHF	CREDIT_GBP	CREDIT_GL	CREDIT_USD	Credit_EUR	Credit_CHF	Credit_GBP
Portfolio	CREDIT_EUR	CREDIT_CHF	CREDIT_GBP	CREDIT_GL	CREDIT_USD	Credit_EUR	Credit_CHF	Credit_GBP
Currency	EUR	EUR	EUR	EUR	EUR	EUR	EUR	EUR
Nominal	191,970,966.32	133,997,166.47	160,197,166.47	476,766,199.17	39,000,000.00	466,663,301.10	194,479,360.07	611,747,199.19
PV	194,661,460.17	136,907,716.69	166,164,467.19	496,177,401.99	40,667,461.11	460,317,161.72	196,191,014.02	616,763,491.20
Mod. Duration	6.17	6.70	6.45	6.34	6.67	6.35	6.02	6.62
Macaulay Duration	6.70	6.97	6.77	6.67	6.91	6.66	6.31	6.94
Convexity	66.16	49.17	66.94	66.92	60.10	64.10	60.10	69.20
YTM	6.12	4.93	6.01	6.14	6.18	6.14	6.07	6.06
Income Yield	4.96	4.67	4.94	4.91	6.32	4.93	4.75	4.77
3m Rolldown Return	6.70	6.12	6.39	6.64	6.62	6.34	6.20	6.19
Spread (bps)	74.40	47.07	64.75	66.69	71.94	66.35	69.37	69.39
Z-Spread	78.71	49.44	66.19	69.70	71.80	69.47	50.16	60.38
Positions	37.00	37.00	49.00	66.00	16.00	99.00	91.00	107.00
Rating Factor	419 (BBB3)	195 (BBB1)	315 (BBB1)	399 (BBB3)	396 (BBB3)	164 (BBB1)	113 (BBB1)	119 (BBB1)
RA Total - Year to Date	CREDIT_EUR	CREDIT_CHF	CREDIT_GBP	CREDIT_GL	CREDIT_USD	Credit_EUR	Credit_CHF	Credit_GBP
Total	104.11	117.00	144.61	171.50	171.37	99.70	64.70	67.60
- FX	-1.19	1.95	-1.66	-1.66	0.00	-3.97	-6.73	-1.72
- Interest Rate	-196.40	-190.79	-101.43	-190.60	-114.00	-103.12	197.64	-106.96
- Spread	111.91	117.65	161.13	176.14	195.31	110.47	79.63	96.91
- Carry	199.77	191.97	197.47	190.42	199.94	196.44	179.45	190.37
RA Total - 1 Month	CREDIT_EUR	CREDIT_CHF	CREDIT_GBP	CREDIT_GL	CREDIT_USD	Credit_EUR	Credit_CHF	Credit_GBP
Total	-3.76	-9.34	-6.95	-3.92	-6.11	-10.08	-11.17	-10.64
- FX	0.99	-1.18	0.66	1.10	0.00	2.00	3.11	-1.48
- Interest Rate	-36.78	-31.12	-36.77	-36.18	37.60	-36.12	-34.14	-37.77
- Spread	17.64	9.11	16.11	17.74	17.97	11.17	7.37	11.94
- Carry	13.60	11.39	13.11	13.42	13.61	12.00	11.61	11.91



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UBS Investment Bank UBS Delta									
Portfolio Summary									
Portfolio	SQU								
Benchmark	IBOXX_CORP								
Portfolio Details									
Portfolio	SQU								
Currency	EUR								
Nominal	32,891,901								
BM Nominal	722,287								
PV	31,287,702								
Benchmark UBS Delta									
Mod. Durat. Performance & Risk Report									
BM Mod. Du 17 November 2008									
Duration Rat									
Macaulay Di									
BM Macaulay									
Convexity									
BM Convexity									
YTM	Portfolio	H066ZA							
BM YTM	Benchmark	BM_G							
Income Yield									
BM Income									
3m Rolldown									
BM 3m Roll									
Spread (bps)									
BM Spread (Total)									
Z-Spread - Curve									
BM Z-Spread - Spread									
Positions									
BM Position: Interest Rate									
Rating Fact: - Parallel									
BM Rating F: - Non Parallel									
- Inflation									
iBoxx Broad - FX									
Return Attribution Summary									
Total									
- Curve									
- Spread Total									
- Interest R - FX									
- Parallel - Interest Rate									
- Non-Par - Spread									
- Inflation - Carry									

Enhanced content:

- o Include bespoke charts & graphs
- o Specify sort &/or filter of data used (e.g. Top 5 portfolio exposures)
- o Add Auto-filter to data column(s)
- o Set Excel formula as a column

Versatile layout:

- o Combine multiple portfolio data
- o Customise colour scheme & formats
- o Include own logo, image & text

File formats:

- o Excel, CSV, Excel-XML and PDF

Scheduling options:

- o Daily, weekly, monthly, every n days

Distribution methods:

- o Electronic, including custom email format with embedded figures
- o Secure connect (as for automated uploads), SFTP

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To R.S.

UBS Investment Bank UBS Delta
Weekly EUR Issuer Changes:

IssuerName	RatingType	Agency	CurrentRating	LastRating	Country	IndustryType
LADBROCKES GROUP FINANCE PLC	Outlook	Moody's	RUR	STA	GB	Gambling
LADBROCKES GROUP FINANCE PLC	Long Term	Moody's	Ba2 *	Ba2	GB	Gambling
FKI PLC	Outlook	SandP	NR	NM	GB	Industrials
					GB	Industrials
					GB	Industrials
					US	Tires
					US	Tires
					US	Tires
					DE	Consumer Goods
					DE	Consumer Goods
					DE	Consumer Goods
					NL	Technology (HY)
					NL	Technology (HY)

UBS Investment Bank UBS Delta

Tier.1 - Best Performers

Stock	Spread	Change
KBC INTERNATIONAL FINANCE NV (GBP 6.202, Perpetual)	689.08	52.97
ANGLO IRISH BANK CORP (GBP 8.533, Perpetual)	2,731.07	-50.48
HBOS PLC (GBP 7.266, Perpetual)		
BANCO SANTANDER SA (GBP 7.005, Perpetual)		
NATIONWIDE BUILDING SOC (GBP 6.024, Perpetual)		

Tier.1 - Worst Performers

Stock
LANSBAY CAPITAL SECURITIES PLC (GBP 6.100, Perpetual)
BRITANNIA BUILDING SOCIETY (GBP 5.556, Perpetual)
DANSKE BANK AJS (GBP 5.684, Perpetual)
ANZ BANKING GROUP LIMITED (GBP 6.540, Perpetual)
NBS FINANCE PLC (GBP 6.289, Perpetual)

LT2 - Best Performers

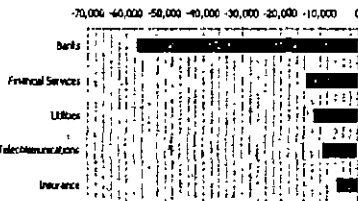
Stock
ALLIED IRISH BANKS PLC (GBP 7.875, 5-Jul-20)
COMMERZBANK AG (GBP 6.625, 30-Aug-20)
UBS AG (GBP 5.250, 21-Jun-2021)
NATIONAL AUSTRALIA BANK LTD (GBP 5.310, 17-Jun-20)
HSBC HOLDINGS PLC (GBP 7.000, 7-Apr-20)

LT2 - Worst Performers

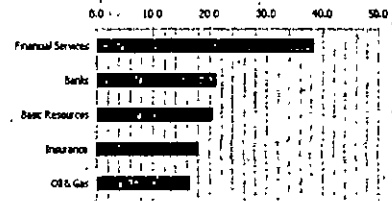
Stock
MACQUARIE BANK LTD (GBP 5.900, 19-Sep-20)
ANZ BANKING GROUP LIMITED (GBP 5.625, 17-Jun-20)
INVESTEC FINANCE PLC (GBP 7.750, 1-Mar-20)
PROVIDENT FINANCIAL PLC (GBP 7.125, 17-Jun-20)
HBOS PLC (GBP 11.000, 17-Jan-2014)

UBS Investment Bank UBS Delta

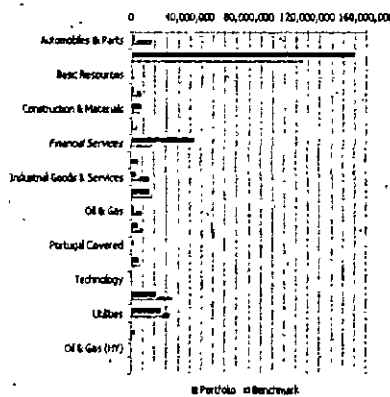
Top 5 Exposure (ODD1) by IBoxx Level 4



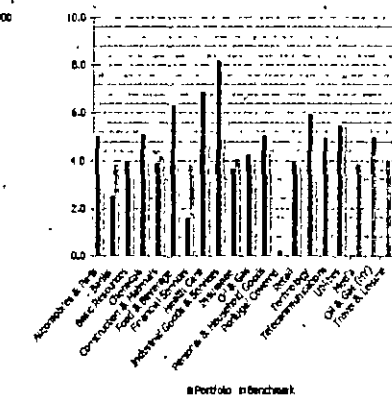
Top 5 Yield by IBoxx Level 4



PV Breakouts by IBoxx Level 4

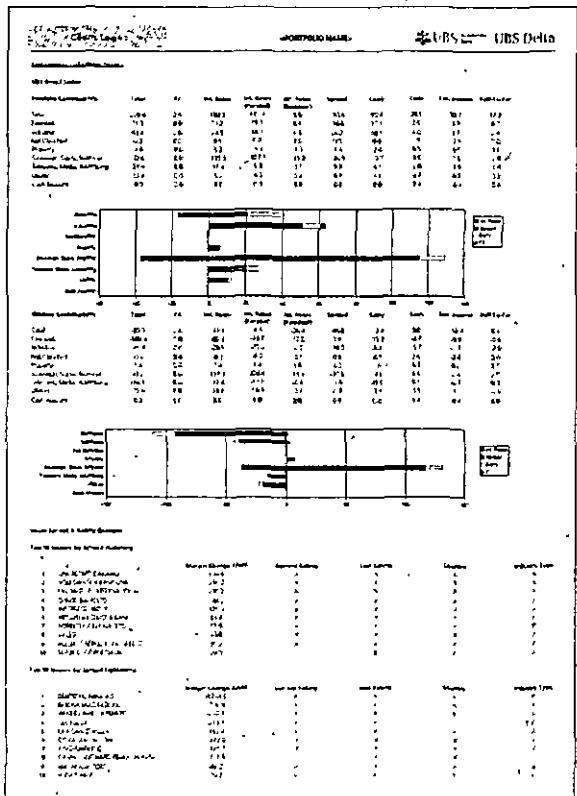
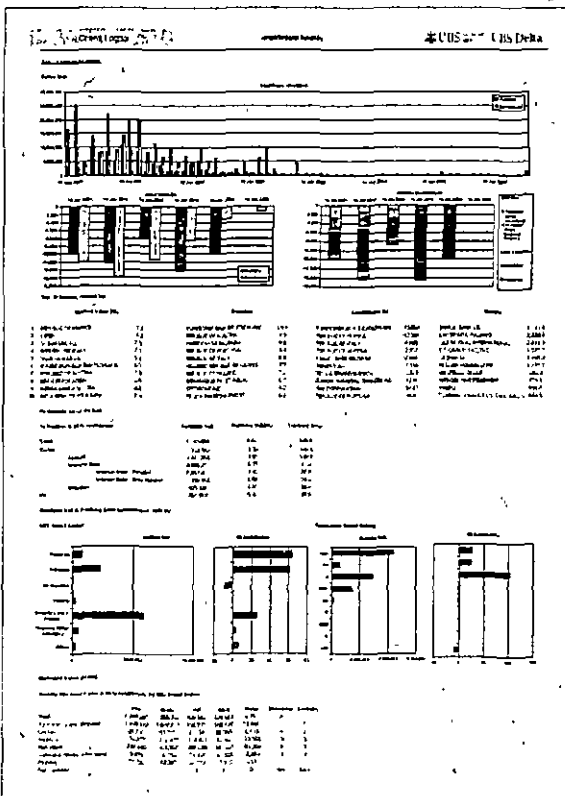
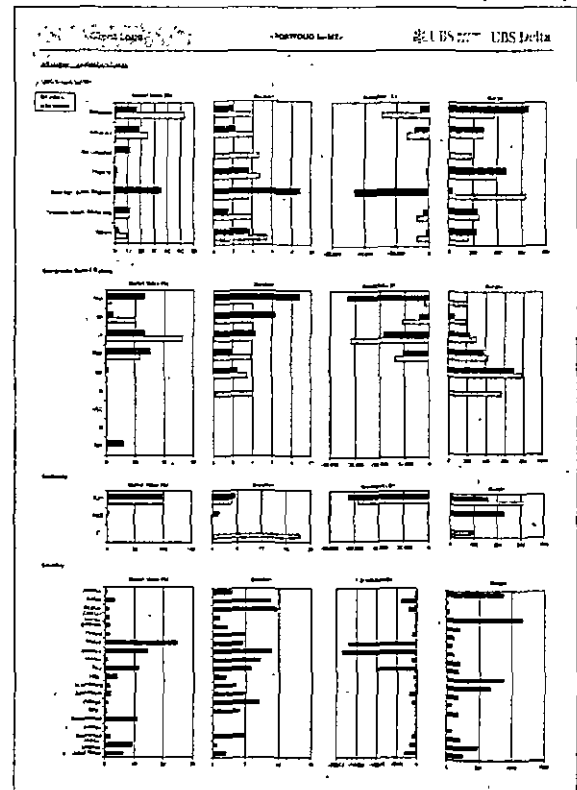
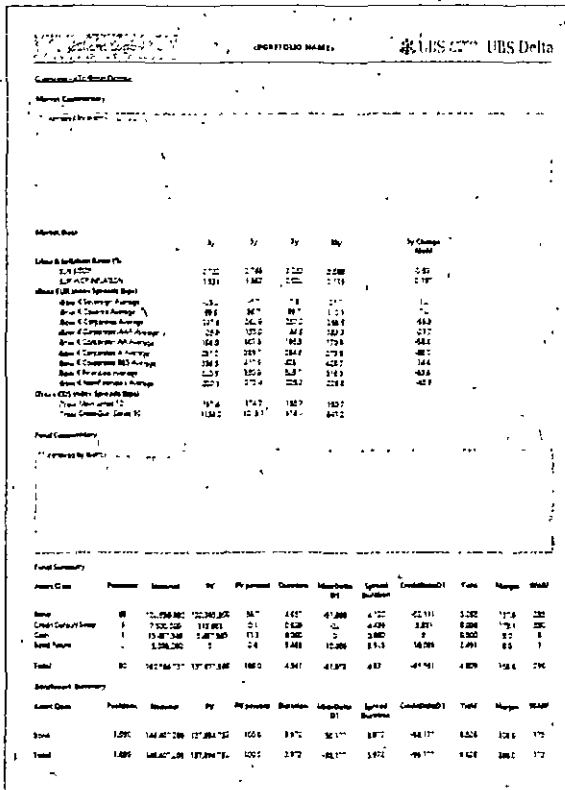


Duration Breakout by IBoxx Level 4



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2.2.6 Sample Portfolio Evaluation
See Annex 3

Handwritten initials/signature

2.2.7 Provision of Trial Period

From 19th September a trial period can be arranged for an arbitrary number of users. A typical trial period is up to 2 months. This period can be extended if necessary. UBS Delta shows big flexibility in this respect. During the trial period all test users get initially an in depth training and afterwards ongoing support.

2.2.8 Training and documentation

UBS Delta has a dedicated training team, lead by Lindsey Matthews. The team offers a variety of training opportunities tailored to reflect the requirements of the clients. These may take place online or at users/UBS Delta offices and include the training team, specialised developer or marketing contact, depending on the level and requirement of the session.

There is no specified training schedule, as the team adapts flexibly to the needs of the users. In general most clients prefer the following format of meetings:

- 1) Group sessions are held either over web conference or in person to present general functionalities within Delta.
- 2) Smaller group workshops are available either in our offices or at user's offices, where users are encouraged to work through exercises, with UBS Delta staff present for questions.
- 3) Individual sessions with users for in-depth questions.
- 4) Ad-hoc meetings with marketers with updates on recent and upcoming developments

In addition, many clients prefer to maintain continuous dialogue with the marketing contact over Bloomberg chats or email in respect of individual ad-hoc questions.

Furthermore, UBS Delta has a dedicated Client Services team reachable via delta@ubs.com responsible for dealing with ongoing queries, should the marketing contact be unavailable.

At different locations worldwide user days are organized at least twice a year to update about new developments in UBS delta and giving users the opportunity to meet with other users and share experiences.

Documentation:

UBS Delta has a library of help sheets and technical documents covering all aspects of UBS Delta usage. These are available in hard copy or pdf formats. This includes general user documentation, technical documentation, interface descriptions etc

All users also have access to a full online help module, updated as our product changes. Sample screenshot shown below.

The screenshot shows the UBS Delta web application. On the left is a navigation menu with categories like 'Welcome to UBS Delta', 'INTERACTIVE TUTORIALS', 'PORTFOLIO ANALYTICS', 'PORTFOLIO CONSTRUCTION', 'PORTFOLIO UTILITIES', and 'PREFERENCES'. The main content area features a 'Term Profile' configuration window with fields for Portfolio, Benchmark, Liability, Tenor, Interval, and Aggregation. Below this window is explanatory text about interval and point aggregation. A table lists 'Nominal', 'PV', 'Credit Delta D1', and 'Labor Delta D1' as items that can be plotted. A 'Calculata' button is visible at the bottom right of the configuration window.

It is possible to plot nominal, PV, Labor and Credit sensitivities of cashflows in each interval

The time buckets can be configured - they begin on 'Start Date', end on 'End Date'

Enter here the length of each Interval in months, e.g. 6 months

Choose between an Interval and a Point Aggregation
For Interval Aggregation, the cashflows occurring within an interval are added together
For Point Aggregation, each cashflow is split between adjacent tenors according to the exact timing of the cashflow
The same methodology is used in calculating Tenor points in Maturity Breakouts

Does the documentation give full transparency on calculation models/methods?

Yes. Wherever possible we provide full documentation on modelling and formulae.

2.2.9 System introduction

Please provide outline of the time required to install the package, including a description of the tasks required to complete an installation (i.e., sample project plan).

The barriers to implementation of UBS Delta are very low. It is a web-delivered ASP (application service provided), and as such requires no local installation, other than a market-standard single digital encryption certificate to be imported into each user's browser. Our system is fully scalable and new users are added everyday. We have a dedicated technical support team on duty 18 hours per day. Users can even be added on in 'batches' for large volumes of new users. User access is based on digital certificate identification – new certificates can be set up within minutes on receipt of a request to add a user. UBS is not permitted to export digital encryption format to certain countries.

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Describe customer resource requirements during the implementation.

Customer resource requirements during implementation are usually focused on delivery of a data feed from client's OMS provider and installation of upload tool (UBS SecureConnect, SFTP).

Residual client-side resource requirements can include:

- o reconciliation of uploads – check that what is in the system is as expected
- o modelling of unsupported assets as synthetic assets within Delta (support and guidelines provided)
- o design of automated reports to client's specifications

Describe type of assistance that is (can potentially be) provided by the vendor?

We generally undertake to support clients to the best of our abilities, including providing training sessions, on-the-desk support, workshops, phone, email and instant messaging support. We are prepared to do bespoke work for clients, and have demonstrated this to all our clients previously.

We are also happy to assist with integration work, providing sample uploads and roadmaps to getting client data formats into UBS Delta.

Other work is undertaken at the discretion of UBS Delta.

2.2.10 Support to live operation

UBS Delta aims to offer users continuous support through our dedicated Client Services team, who work together with the client's primary marketing contact to resolve any questions and requests.

UBS Delta has teams based in London, New York, Tokyo and Singapore working together to provide consistent coverage for a global client base.

UBS Delta offers:

- technical support (24/7)
- content related support (24/5)
- bespoke analyses in areas such as portfolio, risk and/or asset-liability management, structured credit & rates, hedge analysis, transition management and program trading (during office hours)

Some more details:

Does the vendor have a helpdesk both for technical and user issues? What are the opening hours of this helpdesk?

Our contracted hours of coverage are from 9am CET to 6pm CET on London business days. However support is normally provided outside these hours through email (for example we have full email client and technical support from Tokyo and Singapore).

Is the vendor able to provide consultancy? On site?

Yes.

Does the vendor have a process to deal with calls for support and what is the response time?

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Our homepage shows this text box:

Global Support		
English (GMT)	+44 20-7568 6213	<input type="checkbox"/>
English (APAC)	+81-35208 7479	<input type="checkbox"/>
Français	+44 20-7568 3438	<input type="checkbox"/>
Deutsch	+44 20-7568 7651	<input type="checkbox"/>
中文	+44 20-7567 0672	<input type="checkbox"/>
日本語	+81-35208 7479	<input type="checkbox"/>
Support email: delta@ubs.com		

Normal support channels are:

- Phone (direct to the marketer responsible for the account, or to our generic helpdesk numbers)
- Email (direct to marketer, or to generic delta@ubs.com)
- Bloomberg / Reuters instant messaging groups

Most enquiries are dealt with immediately.

If there is a technical problem, requiring developer support, or a bug reported, then we immediately fill out a ticket in our workflow system. We use Atlassian Jira (<http://www.jira.com/>).

A technical lead assigns development responsibility and the project co-ordinator manages the flow back into the software release schedule.

Client facing staff has full access to ensure that they remain up to date with progress reports on issues that concern their clients.

Response time depends on the issue – this is always communicated to clients in a timely manner. We normally push code fixes onto our live servers outside business hours, however if a problem is urgent we can bring down servers during the day to release.

In most cases this is down without affecting clients, as we have a 'farm' of servers where traffic can be redirect as appropriate.

Access support issues can be handled by our 24x7 ehelp team, who can be contacted as follows:

If you forget your password or have any problems, please contact UBS Investment Bank eHelp at email: ehelp@ubs.com or the toll-free telephone numbers below.

Argentina	800-776-81733	Japan	0070-800-828-232
Australia	0011-800-776-81733	Japan (IDC)	0061-800-776-81733
Bahrain	800-507	Japan (ITJ)	0041-800-776-81733
Barbados	1-800-534-1034	Japan (KDD)	001-800-776-81733
Belgium	00-800-776-81733	Luxembourg	800-2-9135
Bermuda	1-800-623-0889	Mexico	001-800-488-1735
Brazil	000-817-776-8173	Netherlands	00-800-776-81733
Canada	800-776-8173	New Zealand	00-800-776-81733
Cayman Islands	800-776-8173	Norway	00-800-776-81733
Chile	1230-020-3283	Panama	1-800-776-8173
China	10800-1300139	Philippines	00-800-776-81733
China (Beijing-Mandarin)	10800 611 0098	Poland	00-800-1113245
China (Shanghai-Mandarin)	10800 361 0117	Portugal	800-813-074
Colombia	9809138173	Puerto Rico	800-776-8173
Costa Rica	0800-013-0429	Singapore	001-800-776-81733
Denmark	00-800-776-81733	South Africa	0800-997-952
Finland	990-800-776-81733	South Korea	00308-13-0826
France	00-800-776-81733	Sweden	00-800-776-81733
Germany	00-800-776-81733	Switzerland	0800-82-82-32

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Hong Kong	001-800-776-81733	Taiwan	00801-14-8170
Hong Kong (Cantonese)	800-967-852	Taiwan (Mandarin)	00801 232379
Hungary	00-800-776-81733	UK	00-800-776-81733
Indonesia	001-803-015-776-8173	United States	800-776-8173
Ireland	00-800-776-81733	US Virgin Islands	800-776-8173
Italy	800-87-4843		

Country Not Listed or 800 Service Unavailable

If you are experiencing issues with your country's toll-free phone system or your country is not listed above, desks can be reached directly at:

U.S. and non Swiss clients please call our U.S. desk with your query at +1-203-719-5100.
Swiss clients please call our Zurich desk with your query at +41 44 239 5320 Japan clients please call our Tokyo desk with your query at +81 3 5208 7780

International rates apply to any call to the direct number

Availability of the system

What does the vendor guarantee about the availability of the system? Will it be available 24/7?

UBS Delta provides 24x5.5 support, during which 100% uptime is our target. Outages are very rare, and usually unobserved by clients due to redundant failover architecture.

Weekend availability is possible, but not guaranteed due to regular database and system maintenance. It is supported on a best-efforts basis, but only limited support is available (e.g. access support is available, but functional support is not)

What are the backup facilities and disaster recovery arrangements?

System architecture allows for loss of one region and application would still function with automatic DNS failover. Regional isolation tests conducted yearly. Business continuity for support staff provided centrally by UBS. Daily backups are taken with a retention period of seven years

How does the vendor inform customers about availability related issues?

Major service announcements are provided on the UBS Delta homepage. Due to regional failover, this page is available to customers at all times. Additional updates are also available via Email and Bloomberg instant messaging.

What are the security standards with regard to:

a. Authentication.

Authentication is two factor using UBS Digital Certificates (Microsoft Certificate Server) and the central UBS 'Client portal' login. This complies with the strict Federal Financial Institutions Economic Council (FFIEC) and Monetary Authority of Singapore (MAS) guidelines.

b. Data encryption.

Web and Secure Connect traffic are 128-bit encrypted over https between UBS and the client.

c. Hosted environment.

Not applicable

d. Data centres.

UBS Delta uses a number of UBS secure data centres based in London, Stamford and Singapore. Access is fully audited and restricted to authorised personnel only. Even day-to-day support staff do not have physical access to the machines.

At what (physical) location would the system be hosted (state, country)? Are there any legal consequences related to this? If so please state them.

Primary service:

UK and European clients use London deployment as primary service.
APAC and US clients use Stamford CT deployment as primary service

Secondary/failover service:

UK and European clients use Stamford deployment as secondary service
APAC and US clients use London deployment as primary service

Responsiveness & performance

How much time will be needed process uploaded data and present the standard reports (of course depending on the amount of data and complexity of the reports, but some indicating figures would be helpful).

Large file uploads can be automated, or can be uploaded directly through the web. For example, a file consisting of 20,000 trades and 100,000 properties on these trades might take 5 minutes to upload.

A typical web-based result such as risk may take 1 or 2 minutes to return for a large portfolio (of say 10,000 positions) providing there is not a large number of complex instruments involved (such as credit tranches or structured libor trades).

Release management:

a. Describe how releases of the system (both server application and client application(s)) are done.

Release Process - Server Applications (client application is not applicable in case of UBS Delta):

- o Server Application is made up of a system of components (e.g. Web, Analytics, Grid, Reporting etc.).
- o All changes to the system/components are recorded and tracked in Atlassian JIRA (our change control system).
- o Changes accepted/marked for a release are then grouped and tracked together as a release set within our source and change control systems (using Component/Release Tags)
- o Individual component versions with selected JIRAs (changes) are built and unit tested on automated Cruise Control (Continuous Integration) servers.
- o Successfully unit tested component versions are published. These published component versions are then built together as a release, which goes through QA & UAT tests.
- o Tests run on QA/UAT cover integration, regression as well as specific functional tests (e.g. bug fixes or new features).

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- o QA tests are signed off by the Development Team, whilst UAT is signed off by business.
- o Signed off releases are pushed to access controlled production environment by the support team (using an automated deployment tool). Under exceptional circumstances the automated deployment tool can be configured to rollback prod to a known and stable production release.
- o Drops to production are sanity tested and monitored by the whole team.
- o On successful implementation of a release in production all tracking JIRAs are closed.
- o All releases to prod are archived for a minimum of 12 months whilst release tags and JIRAs in source and change control are kept permanently.

b. How and when are customers informed, does the vendor provide documentation on changes, fixes, etc?

The application is browser based and hosted by UBS so no client application releases are performed. Server releases are performed using an in-house developed release tool specifically designed for the UBS Delta environment. Releases are normally conducted once every two weeks, although urgent patch releases are sometimes performed more frequently than this

Customers are not impacted by the release cycle, as releases are conducted out of hours in each region globally. In the unusual event of a critical release being required in production hours, load-balanced servers are withdrawn from the pool whilst the release takes place and then reintroduced, one after another. This minimises application downtime.

- o A summary of recent and upcoming client facing changes is published on the UBS Delta landing page
- o Clients are also kept informed of specific issues via email and Bloomberg chat by their UBS Delta contact. Clients often receive day to day progress update of their specific issues.
- o Prior notification to client varies from a few days to a few weeks, depending on the significance and complexity of the issue.
- o Critical changes to analytics/models are published on the landing page with appropriate supporting documentation

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3 Supplementary Services.

In addition what has already been explained above UBS Delta provides the following additional functionality:

1.1 Cross-asset functionality

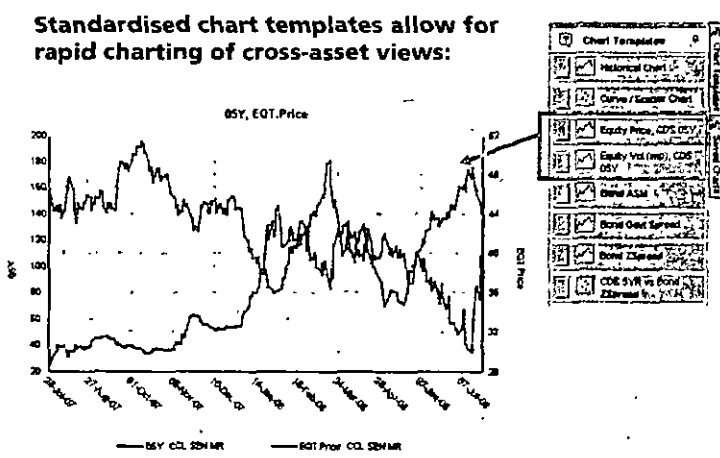
Views can be customised to show cross-asset analytics in one place:
e.g. CDS alongside equity views and balance sheet stats

View: CrossProduct View Apply View

Bond CDS Curve Equity

Description	Curren...	Country	Price	Price_change_1w	CDS 05Y	CDS 05Y_c...	GEARING_2008	EBITDA_2008
CARNIVAL CORP (CCL US)	USD	United States	39.73	31.34	140	-30	0.39	4319.33

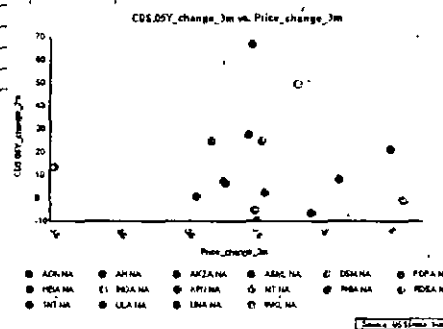
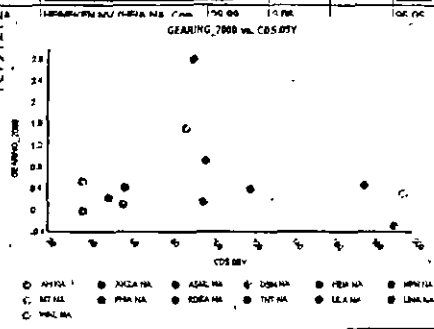
Standardised chart templates allow for rapid charting of cross-asset views:



- Equity indices can be loaded in directly as portfolios or 'user lists'
- Views of sectors can be maintained and shared
- Cross-sectoral views of equity versus debt/CDS statistics can be displayed in graphs or tables

Equity

Ticker	Description	Price	Price_c...	TARGET...	CDS 05Y	CDS 05Y...	GEARIN...	EBITDA_2008	Moody...
AABA NA	ARMANDO HOLDING NV (AA)				87.25	-7.75			Aa2
AGN NA	AGN NV (AGN US, Common)	7.8	6.9	12	126.87	-16.49		3205.84	A2
AH NA	KONINKRIJKE AHOLD NV (AH)	8.13	0.43	9.7	119.52	1.68	0.39	1875	Baa3
AKZA NA	AKZO NOBEL (AKZA NA, Co)	43.24	6.87	73	58.51	-6.68	0.1	2083.08	A3
ASML NA	ASML HOLDING NV (ASML N)	14.28	-0.2	18.5	189.96	8.07	-5.3	823.92	Baa3
CXP NA	CORPORATE EXPRESS NV (C)	10.07	8.88	7.8			0.67	327.51	NBT
DSM NA	KONINKRIJKE DSM NV (DSM)	35.53	6.62	28	57.54	-3.5	0.42	1178.82	A3
FORA NA	FORTIS (FORA NA, Common)	8.65	14.2	12.5	104.24	0.63		8851.57	Aa3
HEIA NA	HEIA NV (HEIA NA, Common)	190.00	14.98			-2.63	0.14		
HEIA NA							0.12		
HEIA NA						-2.49			
HEIA NA						-4.95	2.8		



Current Selection (0)

- User Lists
- Bond Indices
- Bond Indices (Constituents)
- CDS Indices
- CDS Indices (Constituents)
- Equity Research
- Structured Credit
- Portfolios

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I.2 Market monitoring and market intelligence

Monitor

5yr spread widening of > +10bps or more flagged in Red, e.g. Ambac Financial Group, Inc.

Issuer	Country	Face Value	Rating	Yield	Spread	Delta	Gamma	Vega	Theta	Rho
3M Company	USA	100,000	A1	3.87%	0.81	-0.24	1.51	1.98		
ABN AMRO bank N.V.	NLD	1,000,000	A2	4.19%	8.40	3.73	3.82	9.88		
ACE Limited	GBR	1,000,000	A3	3.84%	5.23	5.40	0.25	4.30		
Alzo Med N.V.	NLD	1,000,000	A3	4.19%	8.40	3.73	3.82	9.88		
Ambac SE	DEU	1,000,000	A3	4.19%	8.40	3.73	3.82	9.88		
Ambac Financial Gr	USA	1,000,000	A3	4.19%	8.40	3.73	3.82	9.88		
Ambac Financial Gr	USA	1,000,000	A3	4.19%	8.40	3.73	3.82	9.88		

Collateral Pool

Agency: Moody's

Rank	Reference	Face Value	Terminal Value	Spread (bps)	Industry	Issuer Rating	Issue Rating	Watch	Similarity	Domestic
1	3M Company (SEN)	1,000,000	1,000,000	16	Diversified Conglomerate Manufacturing	Aa1	Aa1	Unrec		United States
2	ABN AMRO bank N.V. (SEN)	1,000,000	1,000,000	85	Banking	Aa2	Aa2	Unrec		Netherlands
3	ACE Limited (SEN)	1,000,000	1,000,000	40	Insurance	A3	A3	Unrec		United States
4	Alzo Med N.V. (SEN)	1,000,000	1,000,000	40	Chemicals, Plastic and Rubber	A3	A3	NSG		Netherlands
5	Ambac SE (SEN)	1,000,000	1,000,000	40	Insurance	Aa3	Aa3	Unrec		Germany

markit

I.3 Compliance reporting and monitoring of investment guidelines, UCITS reporting

UBS Delta can be used to monitor compliance metrics and investment guidelines via reporting output or via the website. We have also implemented a conditional reporting engine, which will only send reports – or alerts – whenever a certain criteria is hit. For example, % sub investment grade assets > 5%. UCITS reporting is available.

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4 Business Offer.

All charges (unless specified) are quoted in EUR and apply annually.

Charges are comprised of the constituent service elements that the client, in agreement with UBS, has elected to use.

UBS Delta Website access:

Core offering

The UBS Delta core offering comprises use of the web application for an agreed number of users.

Core functional modules include:

- Breakouts
- Cashflows
- Market Analytics
- Pool Monitor
- Risk (including Scenarios, Parametric risk, Historical VaR)
- Return Attribution
- Optimiser & Hedge Calculator

Charging for the core offering is reflected in a per-user, per-annum charge as follows:

For non-admin users:

Max number of users (band)	Annual Charge		Charge per extra user until next band	
		Service Profile 2*		Service Profile 2*
1		90,000		15,000
5		150,000		10,000
15		250,000		8,000
25		330,000		7,000

For example:

10 users under service profile 2 would be charged:
 150k (5 user band) + 5*10k (5 extra users) = 200k EUR

15 users under service profile 2 would be charged:
 250 k (15 user band)

Admin users are cheaper:
 Service profile 2 – 7k/admin user

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An admin user is a Client User solely concerned with the maintenance of the data input into UBS Delta and/or the administration of user permissions and preferences and/or the support of a client's IT infrastructure. Client must not allow the access as an admin user for any other purpose. Clients Users are only eligible to be charged at admin user rates if agreed in advance with UBS.

Premium functionality

Premium functionality is categorised by asset class and by functional module. UBS may also agree to provide access to Client to certain premium functionality of UBS as follows:

Functional Modules

Module	Charge
CVA	Subject to separate agreement
Rules Engine	Subject to separate agreement
Extract of Curve Data	Subject to separate agreement

Asset Classes

Asset Class Group	Charge
Structured Credit	50k
Other Structured (incl. multi-asset hybrid, str libor)	10k trade

All purchased premium functionality is enabled for all relevant Client Users.

Optional automated UBS Delta Reporting

UBS Delta offers clients the optional service of the scheduled running of standard reports, and building and scheduled running of customised reports, bespoke to the client.

Charging for the reporting offering is divided into three parts:

- (i) A per-annum, per-report charge, incorporating the frequency of running (small reports);
- (ii) A per-annum, per-report charge, incorporating the frequency of running (large reports);
- (ii) A per-bespoke building charge, that factors in the cost of building of the customised report.

Reports are subject to an aggregate reporting charge per annum. Further details are set out below:

Scheduled Report Running

Pricing is per Report.

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i) For Reports run on no more than 10k positions and for no more than 20 portfolios (small reports):

Frequency	Off-Peak	Peak
Daily	6000	12000
Weekly	2500	5000
Monthly	1000	2000

The first weekly off-peak small report and first monthly off-peak small report are not chargeable.

ii) For Reports run on more than 10k positions and/or where number of portfolios exceeds 20 (large reports):

Frequency	Off-Peak	Peak
Daily	30,000	60,000
Weekly	12,500	25,000
Monthly	5,000	10,000

iii) High Usage Minimums.

Clients running large reports are subject to a 100k minimum aggregate reporting charge per annum.

Clients are subject to a 100k minimum aggregate reporting charge per annum if the aggregate number of unique portfolios on which reports are run exceeds 50 portfolios.

iv) Off-Peak/Peak

Peak reports are scheduled to start running before 12:00 GMT.

Off-peak reports are scheduled to start running between 12:00 GMT and midnight GMT.

Bespoke Report Building

Daily rate of 3k/day – estimated in advance.

***Service Profile 2:**

1. **Background**

This Service Profile applies to clients who use UBS Delta for a fee including as part of their compliance and control infrastructure. Provisions concerning scope, changes, termination and liability have been agreed accordingly as follows:

2. **Scope of Use**

2.1 Client may use UBS Delta for:

- 2.1.1 investment decision support purposes;
- 2.1.2 risk analysis and reporting; and
- 2.1.3 performance attribution,

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including as part of its compliance and control infrastructure,
the ("**Purpose**").

2.2 Without prejudice to the applicability of other terms and conditions set out herein

3. **Changes**

3.1 UBS shall be entitled to revise any or all aspects of UBS Delta at any time at its sole discretion. UBS shall give Client as much notice as reasonably practicable of any significant changes to the functionality of UBS Delta.

4. **Termination**

4.1 Either party may terminate this Agreement on 3 months' written notice to the other at any time.

5. **Liability**

5.1 UBS's Liability Cap for the purposes of clause **Error! Reference source not found.** of Annex A (UBS DELTA™ Terms of Use) shall be the greater of 125% of the Charges paid by Client in the 12 months prior to the event giving rise to the claim first occurring, and £70,000.

5 Annexes.

Annex 1: Fiche

Annex 2: TENDERER'S DECLARATION PURSUANT to Article 121(3) of the PPA

Annex 3: Sample Portfolio Evaluation

Annex 4: License Agreement

UBS AG

(Dr. Bernd Schmid)

London, 13th September 2011

Dr B.S.

Detailed rules for payment of consideration

1.) Contractor is required to make out a statement in writing, and deliver it to the Contracting Entity before the time of acceptance of performance to declare as to the share Contractor is entitled to receive from the Contract Price. This clause applies to tenders submitted jointly.

2.) Contractor is required to make out a statement before the time of acceptance of performance to declare as to the share of subcontractors involved, and the share of experts engaged in the execution of their contract by means other than contract of employment or other employment relationship to which each one of them is entitled to receive from the Contract Price, and shall instruct the subcontractors and experts at the same time to make out their respective invoices. This statement is a separate document, detached from the certificate of performance, containing the following information: subcontractor's name, address, tax number, bank account number registered in the register of companies, sum due to the subcontractor.

3.) Contractor shall be entitled to make out an invoice to the Contracting Entity without delay upon the acceptance of performance, in any case within 3 working days of the time of receipt of the certificate of performance, for a sum that is due to its subcontractors involved and to the experts engaged in the execution of the contract by means other than contract of employment or other employment relationship. Copies of the invoices of subcontractors involved and to the experts engaged in the execution of the contract by means other than contract of employment or other employment relationship made out to the Contractor, the certificate of performance and the statement referred to above must be enclosed with, comprising an inseparable part of the Contractor's invoice.

4.) Contracting Entity shall remit payment of the amount invoiced according to Paragraph 3 to the Contractor within 15 days from the date the invoice was made out to the bank account Contractor has indicated on the relevant invoice. Contractor shall ensure to have the invoice delivered to the Contracting Entity at least 8 days before the payment due date indicated in the invoice.

5.) Contractor shall forthwith pay the invoices of subcontractors and experts, or shall withhold such payment (or a part of the sum) in accordance with Article 36/A(3) of Act XCII/2003 on the Rules of Taxation (hereinafter referred to as "Taxation Act"). Contractor shall effect payment to the bank account numbers of subcontractors registered in the register of companies.

6.) Contractor shall give to the Contracting Entity copies of the certificates of the transfers made under Paragraph 5, or copies of the combined tax certificates of the subcontractor (expert) showing any outstanding public dues [the latter with a view to enabling the Contracting Entity to determine as to whether the Contractor had any legitimate reason for not paying the (full) amount to the subcontractor affected]. Copies of paper-based bank account statements are also required, made wholly on the statement, where only those items and contents may be concealed or covered up which are irrelevant for MNB. If the statement is made electronically, it may be edited to an extent without altering the original layout, containing all information of the original version which are deemed to be of relevance for MNB. All these documents are to be submitted enclosed with the invoice. At the same time, Contractor shall present the invoice for the remaining portion of the Contract Price, that the Contracting Entity shall pay within 15 days to the Contractor, if the Contractor satisfied all payment obligations to his subcontractors, including the obligations prescribed under Article 36/A of the Taxation Act.

7.) If the Contractor fails to satisfy the obligation under Paragraph 6, the Contracting Entity shall retain the sum remaining from the Contract Price and shall release it to the Contractor if able to prove of having satisfied the obligation under Paragraph 6, or if able to produce documentary evidence to the effect that the subcontractor or expert is not entitled to the sum the Contractor has notified according to Paragraph 2, or to any part of that sum.

8.) If the Contracting Entity pays the Contract Price in several instalments, the provisions laid down in this annex shall apply with respect to each instalment.

9.) If performance is approved as contracted and payment is not received within the prescribed time limit, the Contractor shall have the right to post a collection order - in possession of the authorisation fixed in the annex to this Contract - against the payment account of the Contracting Entity, provided that the Contractor has satisfied all obligations conferred upon him by this annex.

10.) Contractor shall be entitled to submit any and all documents mentioned in this annex - with the exception of paper-based and electronic invoices - by way of electronic means, subject to using the formal requirements set out in this annex. Contractor is required to send electronic documents to Contracting Entity's Gazdalkodasiugyintezok@mnb.hu. E-mail address.

If the Contractor wishes to submit his invoice in electronic format, it shall be governed the relevant provisions of the contract, rather than by this paragraph.

11.) Contractor shall be able to submit an invoice on completion of the works to which the contract relates in accordance with the relevant legislation and with this contract, where such performance is verified by the Contracting Entity's authorised agent by means of a certificate of performance.

12.) Upon paying the invoice the Contracting Entity reserves all rights relating to or arising from any defective performance or other breach of contract on the Contractor's part.

13.) If the Contractor fails to conform with the requirements set out in this contract, the Contracting Entity shall be entitled to return such invoice within five working days of receipt and to refuse payment without falling in delay thereby, whereupon the Contractor is required to make out another invoice, where the invoice date may not antedate the day when the Contracting Entity returned the Contractor's previous invoice stating that it failed to conform with the requirements set out in this contract. In this case the Contractor shall not be entitled to decline or terminate further performance of the contract.

14.) Contractor's signature of this contract shall constitute his acknowledgement for granting Contracting Entity the right to deduct any homogenous, overdue and uncontested claim the Contracting Entity may have from the Contractor from any payment that is due to the Contractor.

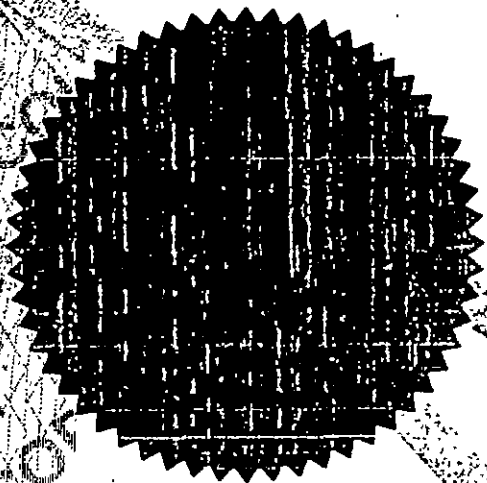
15.) Contractor shall be entitled to charge default interest in the event of Contracting Entity's delay in payment, for each day of delay in accordance with Article 301/A of the Civil Code. Contractor shall have the right to make the provision of further services conditional upon changes in the payment terms and conditions, or to suspend services, if the Contracting Entity falls more than 14 days behind in payment for reasons within its control.

N P Ready
R M Campbell
J B Burgess
E Gardiner
A J Claudet
I A Rogers

A Grafton
L Hyde-Vaamonde
M Scott

TO ALL TO WHOM THESE PRESENTS SHALL COME, I
JEREMY BROOKER BURGESS of the City of London, England
NOTARY PUBLIC by royal authority duly admitted, sworn and
holding a faculty to practise throughout England and Wales,
DO HEREBY CERTIFY the genuineness of the signature
subscribed to the document hereunto annexed, such
signature being in the own, true and proper handwriting of
BERND MARKUS SCHMID, whose identity I attest and who is an
authorised signatory of **UBS LIMITED**, a United Kingdom
company duly organised and existing, registered with the
Registrar of Companies for England and Wales under number
02035362.

IN FAITH AND TESTIMONY WHEREOF I the said notary have
subscribed my name and set and affixed my seal of office in
London, England this fifth day of December in the year two
thousand and eleven.



11 12



APOSTILLE

(Hague Convention of 5 October 1961 / Convention de La Haye du 5 octobre 1961)

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

- 1. Country: United Kingdom of Great Britain and Northern Ireland
Pays: Royaume-Uni de Grande-Bretagne et d'Irlande du Nord
This public document / Le présent acte public
- 2. Has been signed by: Jeremy Brooker Burgess
a été signé par
- 3. Acting in the capacity of: Notary Public
agissant en qualité de
- 4. Bearer the seal/stamp of: The Said Notary Public
est revêtu du sceau/timbre de
- 5. at London/Londres
- 6. Certified/Atteste the/le 05 December 2011
- 7. by Her Majesty's Principal Secretary of State for Foreign and Commonwealth Affairs /
par le Secrétaire d'Etat Principal de Sa Majesté aux Affaires Étrangères et du Commonwealth
- 8. Number/sous No: 1076357
- 9. Stamp
- 10. Signature: J. Casey



Handwritten signature of J. Casey

For the Secretary of State / Pour le Secrétaire d'Etat

If this document is to be used in a country which is not party to the Hague Convention of 5th October 1961, it should be presented to the consular section of the mission representing that country.

An apostille or legalisation certificate only confirms that the signature, seal or stamp on the document is genuine. It does not mean that the content of the document is correct or that the Foreign & Commonwealth Office approves of the content.

TENDERER'S DECLARATION
PURSUANT TO ARTICLE 121(3) OF THE PPA

I, the undersigned, RODOLFO SALVANI as the person vested with the power of representation of UBS Limited, London, the Tenderer (company name, registered office), being aware of my responsibility,

declare

that hereby we wish to submit an offer in the accelerated negotiated public procurement procedure launched by the Magyar Nemzeti Bank as Contracting Authority through the announcement entitled 'Subscription to portfolio management system (KBE/126/2010)'.

We acknowledge that the terms and conditions set forth in the invitation to participate, in the contract notice and the documentation as well as in other documents related to the public procurement procedure are binding upon us as tenderers, in accordance with the provisions set out in Article 127 (2) of the PPA.

We declare that we have become acquainted with, understood and accept with this declaration the provisions of the PPA as well as all the content and form requirements, instructions, terms and conditions included in the invitation to participate, the contract notice and the documentation, and that we have prepared and are submitting our offer accordingly. The invitation to participate, the contract notice and the documentation were suitable for us to compile an adequate offer, and we have prepared our offer accordingly.

We declare that the statements made in our offer correspond to the facts.

We declare that we have the adequate right and expertise to perform the work applied for.

We, as winners of the procedure, undertake to conclude the draft contract issued in the Documentation with the Contracting Authority WITHOUT ANY CHANGES (the ellipses in the draft contract should duly be completed), and to carry out the work for the amount of compensation indicated in the project fiche. WE HAVE NOT MADE ANY CHANGES TO THE DRAFT CONTRACT.

5th Dec., 2011. LONDON

Handwritten signature of Rodolfo Salvani
authorised signature

84 15.

Chartis Europe S.A., Courbevoie
Zweigniederlassung Zürich
Gutenbergstrasse 1
Postfach, 8027, Zürich

Tel. +41 (0)43 333 3700
Fax +41 (0)43 333 3799
www.chartisinsurance.ch
Geschäftsstelle für das ganze schweizerische Geschäft

APPENDIX C

CHARTIS 

To Whom it May Concern

Certificate of Insurance


Named Insured:	UBS AG
Policy Number:	ZF54C00003
Coverage:	Bankers' Professional Liability & Bankers' Blanket Bond
Limits of Liability:	USD 50,000,000 per claim and in the aggregate. This limit will also be used in difference against local policies in USA, Australia, UK (FOS) and other jurisdictions as expressly agreed by the Insurer.
Deductible:	USD Nil
Period of Insurance:	July 1, 2011 to July 1, 2012

This is to certify that the above mentioned Policy is current and in force until the due date shown.

Subject always to the terms, conditions, exclusions and limitations of the Policy.

Zurich, 29 June 2011

Chartis Europe S.A., Courbevoie
Zweigniederlassung Zürich


Urs Marbot
Manager
Operations & Systems


Maria Bravaccini
Supervisor
Major Account Service Team

Chartis Europe S.A., Courbevoie
Zweigniederlassung Zürich
Gutenbergstrasse 1
Postfach, 8027 Zürich

90 B.S.



ZURICH®

CERTIFICATE OF INSURANCE NO. Z111381

Zurich Insurance Company Ltd confirms herewith that the Policyholder mentioned below has liability insurance which provides coverage according to the terms and conditions set out in the policy. This confirmation does not change, increase, amend or correct any coverage specified in the policy. The original policy limit might be higher than shown below. Limits shown may have been reduced or exhausted by claims payments.

Policyholder	UBS AG Bahnhofstrasse 45 CH-8021 Zürich
Policy No	LA 86'927-05
Type of insurance	General Liability
Limit of Indemnity	CHF 100'000'000 per occurrence and in the aggregate per insurance year combined for bodily injury and property damage
This Certificate is valid from	July 1, 2011 until June 30, 2014

Zurich, 05.12.2011

Zurich Insurance Company Ltd
Global Corporate Switzerland



Barbara Bandi



Emanuel Frei

This Certificate of Insurance is not valid without officially authorised signatures of Zurich Insurance Company Ltd.

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Appendix 6

GENERAL TERMS AND CONDITIONS OF THE LICENSOR

UBS DELTA™ Use Agreement

(which shall be, for the purpose of the License Agreement, the General Terms and Conditions of the Licensor)

This agreement (the "Agreement") is made between:

1. UBS Limited, registered in England and Wales under number 2035362, whose address is 1 Finsbury Avenue, London, EC2M 2PP ("UBS"), who is the Licensor under the License Agreement, and
2. the Client as set out in the License Agreement.

Term Sheet

This Agreement is made on the terms set out in Annex A (UBS Delta™ Terms of Use) and the following terms:

Effective Date:	As per the License Agreement (the "Effective Date")
Term:	As per the License Agreement (the "Term")
Maximum Users:	As per the License Agreement ("Maximum Users")
Reports	None. ("Reports")
Charges:	As per the License Agreement. Thereafter for additional Clients, Users, Reports or other services (including premium functionality unless otherwise set out in the Special Terms below), the charges shall be as set out in Annex B (Charges) (the "Charges").
Service Profile:	Service Profile 2 as more specifically set out in Annex C (Service Profile) (the "Service Profile")
Authorised Affiliates	None.

Special Terms:

1. The terms set out in the License Agreement shall be considered special terms.

Annex A
UBS Delta™ Terms of Use

1. Provision of UBS Delta

- 1.1 With effect from the Effective Date, UBS shall provide to Client
 - (a) UBS Delta (which shall mean the web based UBS Delta tool as updated from time to time as well as any agreed premium or bespoke functionality), and/or
 - (b) the services related to UBS Delta set out in this Agreement or as agreed between Client and UBS from time to time (which may, without limitation, include the provision of Reports or consultancy, and Training and Support pursuant to clause 2),

(together the "Services").
- 1.2 In certain jurisdictions, the Services may be provided to Client by an Affiliate of UBS. In this Agreement, an "Affiliate" of UBS shall mean an entity (i) that controls UBS, (ii) that is controlled by UBS, or (iii) that is controlled by an entity that also controls UBS, where "control" includes direct or indirect control.
- 1.3 UBS may without terminating this Agreement suspend the provision of the Services to Client in whole or in part until further notice with immediate effect
 - (a) to test, repair, modify, maintain or improve the Services;
 - (b) to comply with any order, instruction or request of any government, or other competent administrative or regulatory authority;
 - (c) if UBS has reasonable cause to believe that the Services are being used fraudulently, or in such a way as to constitute a breach of the provisions of this Agreement (including, for the avoidance of doubt, clause Hiba! A hivatkozási forrás nem található.); or
 - (d) where, in the opinion of UBS, circumstances outside UBS's reasonable control make such suspension necessary or desirable.

UBS will give Client as much notice as is reasonably practicable of any such suspension and will use its reasonable endeavours to reinstate the provision of the Services as soon as reasonably practicable. Time of performance of the Services is not of the essence and shall not be made so by notice.
- 1.4 Client agrees to provide UBS with such assistance and/or feed-back as UBS may reasonably require in order to enable UBS to provide the Services to Client pursuant to this Agreement.

2 Training and Support

APPENDIX 6

2.1 UBS will use its reasonable endeavours to provide timely support between the hours of 8am and 6pm UK time on every business day in London. Client may contact UBS to request reasonable support via telephone and e-mail to such telephone number(s) or email addresses given to client from time to time for that purpose.

2.2 UBS may provide additional training and support services in respect of the Services at its discretion.

3. Grant of Licence and Conditions of Use

Grant of Licence

3.1 UBS grants to Client and Client accepts a non-exclusive, non-transferable, royalty-free licence for the Client Users (as defined below) to access and use the Services for the term of this Agreement for the purpose defined in the Service Profile (the "Purpose") subject to the terms and conditions set out in this Agreement.

Client Users

3.2 The parties shall agree in writing from time to time the names of Client's (or subject to clause Hiba! A hivatkozási forrás nem található, Client's Authorised Affiliates') officers or employees which Client has nominated to have access to the Services ("Client Users"). Client shall provide such details of its Client Users as UBS may reasonably request from time to time. Client shall ensure that each Client User is aware of and has read terms of this Agreement prior to his or her use of the Services.

3.3 The number of Client Users may not exceed the Maximum Users however in the event that Client requests additional Client Users above the agreed Maximum Users, and UBS agrees to such request, UBS may increase the Charges as set out in Annex B (Charges).

3.4 UBS will allocate a username and password in respect of each Client User. UBS has the right to change and/or revoke and reissue each username and/or password as it thinks fit. Client shall ensure that all such usernames and passwords are kept secure and Client shall take all reasonable steps to prevent unauthorised usage of each Client User's username and password and/or unauthorised access to the Services. For the avoidance of doubt, usernames and passwords are not transferable and the Client shall ensure that each username and password shall only be used by the appointed Client User. The Client shall ensure that under no circumstances shall any Client User disclose his/her password to any other person.

3.5 Client shall comply and shall ensure that each Client User shall comply with warnings, notices and instructions presented in any part of the Services and shall otherwise use the Services only in accordance with the documentation made available to Client or Client Users from time to time.

3.6 Client acknowledges and agrees that information contained in the Services will be accessible by all Client Users and Client accepts all responsibility for any breach of Client's internal procedures, including but not limited to "Information Barriers", which may result from any such access.

3.7 In the event that any Client User ceases to be an employee or director of Client or authorised by Client to access UBS Delta or have the benefit of the Services in accordance with the terms of this Agreement, Client shall notify UBS as soon as possible and UBS will as soon as reasonably possible upon receipt of such notice disable the password in relation to such Client User and so deny that Client User access to the Services. Client may then nominate an alternative Client User to UBS subject to the terms of this Agreement.

3.8 UBS is under no duty of enquiry or verification regarding the capacity or identity of any person using such password and any such person will be viewed as having the authority to bind the Client.

Applicable Law

3.9 Client will comply and will ensure that the Client Users comply with the terms of this Agreement and all applicable laws, rules and regulations in force from time to time ("Applicable Law") throughout the term of this Agreement. Without limiting the generality of the foregoing:

(a) if required by Applicable Law (including in respect of "Inducements") (i) Client undertakes to make such disclosures to its clients and active prospects about its use of the Services and the benefit it attributes to it, (ii) gain two-way client consent and (iii) make any required periodic notification to clients, and

(b) Client warrants that it has determined that use of the Services will enhance the quality of service it provides to its clients and therefore that such use does not of itself impair Client's compliance with its duty to act in the best interests of its clients, and in particular in meeting its best execution obligations.

Client User and General Usage Data

3.10 Client acknowledges and agrees that, subject to UBS's confidentiality obligations set out in clause Hiba! A hivatkozási forrás nem található, UBS may collect and maintain personal data regarding Client Users (limited to their name, job title and contact details and such other personal data as may be disclosed by Client or Client Users to UBS from time to time) ("Contact Details"). Such Contact Details will be used solely for the purpose of providing the Services to Client. Client agrees to ensure that each Client User has consented to the collection, processing and transfer of his/her Contact Details in accordance with this Agreement, as may be required by any Applicable Law. Client will notify UBS of any changes to a Client User's Contact Details.

3.11 Client acknowledges and agrees that, subject to UBS's confidentiality obligations set out in clause Hiba! A hivatkozási forrás nem található, UBS and its Affiliates may also collect and maintain general data regarding Client's access to and use of the Services (including by way of "cookies"). Such general data will be used solely for the purposes of providing the Services and maintaining a record of and analysing Client's usage of the Services. Client acknowledges and agrees that UBS and its Affiliates may also use or share with third parties such data in an anonymised, aggregated form for any purpose, which for the avoidance of doubt shall not be considered a breach of this Agreement.

3.12 Data collected and maintained pursuant to clauses Hiba! A hivatkozási forrás nem található, and Hiba! A hivatkozási forrás nem található, may be transferred to any country in which UBS or any of its Affiliates from time to time does business (including for the avoidance of doubt Switzerland, the United Kingdom, the United States of America, Singapore and Hong Kong) and processed by UBS, its Affiliates or a third party or third parties acting on behalf of UBS or its Affiliates solely for the purposes described in clauses Hiba! A hivatkozási forrás nem található, and Hiba! A hivatkozási forrás nem található. UBS shall comply with Applicable Law when undertaking such activities.

3.13 Client agrees to waive any banking secrecy protections (for example, Swiss banking secrecy protections) which may apply under any Applicable Law solely to enable such transfer and/or processing as reasonably deemed necessary by UBS to provide the Services.

Authorised Affiliates

3.14. In the event that UBS has agreed to allow an Authorised Affiliate of Client to access UBS Delta or otherwise receive the Services:

- (a) Client will ensure that an individual with the power and authority to bind such Authorised Affiliate has read and accepted this Agreement;
- (b) Client shall notify UBS of which Client Users are using the Services on behalf of which Authorised Affiliate, and

in any case the use of the Services by any Client User on behalf of such Authorised Affiliate constitutes acceptance by that Authorised Affiliate:

- (c) that they are bound by the terms and conditions set out in this Agreement as if they were Client (save that (i) the Charges shall be payable by Client and shall be deemed to be in respect of all Authorised Affiliates, (ii) the limit of UBS's liability to Client and all Authorised Affiliates in aggregate shall not exceed that set out in clause 7 in respect of Client and (iii) any claim or right of action against UBS arising out of this Agreement shall hereby be assigned to and brought by Client only); and
- (d) that UBS may enforce this Agreement against that Authorised Affiliate directly

3.15. Without prejudice to UBS's ability to enforce its rights against Client's Authorised Affiliates pursuant to clause **Hiba! A hivatkozási forrás nem található.** or otherwise, Client shall remain jointly and severally liable for its and its Authorised Affiliates' compliance with this Agreement and for the avoidance of doubt any breach of the terms and conditions of this Agreement by an Authorised Affiliate shall also be deemed a breach of this Agreement by Client

3.16. Either Party may upon written notice to the other remove an affiliate of Client from the list of Authorised Affiliates. Thereafter:

- (a) UBS shall be entitled to immediately cease providing the Services to that former Authorised Affiliate;
- (b) UBS shall be entitled to revoke the access of any Client User using the Services on behalf of an Authorised Affiliate so as to deny that former Authorised Affiliate access to the Services, and
- (c) Client shall ensure that, if requested by UBS, such former Authorised Affiliate shall return to UBS, or at UBS's option destroy, all copies, whether hard-copy or electronic, of all UBS Delta training manuals, explanations of UBS Delta methodology and materials relating to any UBS Delta training workshops, together with such other information relating to the Services as UBS may require, but excluding all information relating to such former Authorised Affiliate's portfolio; except any copies which such former Authorised Affiliate is required to retain for legal or regulatory purposes.

3.17. In the event that an Authorised Affiliate ceases to be or Client becomes aware that an Authorised Affiliate is likely to cease to be an Affiliate of Client, Client undertakes to notify UBS immediately. For the avoidance of doubt UBS may at its option invoke clause **Hiba! A hivatkozási forrás nem található.** or may at its option require that Authorised Affiliate / former Authorised Affiliate to enter into a separate agreement permitting its continued use of the Services

Market Data

3.18. UBS may provide market data ("Market Data") to Client through the Services. Certain Market Data may be obtained by UBS from third parties ("Market Data Vendors"). Client acknowledges that UBS's use and distribution of Market Data is subject to the terms and conditions of Market Data Vendors and accordingly, Client undertakes to comply with the UBS DELTA™ Market Data

Terms and Conditions accessible from UBS Delta, as updated, amended, replaced or superseded from time to time (a copy of which at the date of this Agreement is affixed at Annex D (Market Data))

Encryption, transmission of information and linked sites

3.19. Client Users may be required to obtain and install on their internet browser application a signed digital certificate (such certificate at UBS's cost) from UBS or a certification authority selected by UBS, in order to access the Services. Digital certificates are not transferable and may be revoked or replaced at any time. The use of digital certificates is subject to terms and conditions (if any) specified by the certification authority (which shall be of general applicability to UBS Delta™ clients). UBS makes no warranty or representation in respect of the issuance and use of the digital certificates.

3.20. With the exception of the digital certificates referred to in clause **Hiba! A hivatkozási forrás nem található.**, Client is responsible for and must provide all telephone, internet connectivity and other equipment necessary to use the Services (including a compatible internet browser application as approved by UBS).

3.21. Client acknowledges that the Services incorporate encryption technology. Client agrees to comply with all applicable export laws and restrictions and regulations of the US Department of State, Department of Commerce or other United States or foreign agency or authority, and not to export or re-export such technology in violation of any such restrictions, laws or regulations, or without all necessary approvals. UBS shall not be responsible for any breakdown in encryption and/or electronic transmission of information.

3.22. Client agrees that, when using the Internet, Client will be using media and a physical network not controlled, maintained or provided by UBS. Client acknowledges that the reliability, security, availability, legality, performance and other aspects of the Internet are beyond UBS's control and are not in any way warranted or supported by UBS, and Client assumes all risk and liability of any use of the Internet in connection with the Services. Client agrees that, in addition to this Agreement, it will be subject to any disclaimer and terms of use presented in respect of the access to and use of the Services or their supporting infrastructure (including UBS's client portal). In the event of any conflict between those disclaimers and terms of use and this Agreement, this Agreement shall take precedence (subject to clause **Hiba! A hivatkozási forrás nem található.** in respect of any update, replacement or amendment to Annex F (Disclaimer)).

3.23. Client acknowledges that by virtue of this Agreement or the use of the Services, UBS assumes no responsibility for third party web-sites or services linked from or accessed via UBS Delta or the Services.

Distribution of Output

3.24. Client may reproduce and distribute internally (but not sell or market), for its normal internal business use only a reasonable amount of Reports and/or UBS Delta™ output (each "UBS Delta Output") while making ordinary use of the Services.

3.25. Subject to clause **Hiba! A hivatkozási forrás nem található.**, and clause 3.28 (which will for the avoidance of doubt take precedence of this right in respect of UBS Delta Output containing certain Market Data), Client may reproduce and distribute UBS Delta Output to (i) its clients and active prospects; and (ii) if the Purpose includes the use of the Services as part of Client's compliance and control infrastructure, to its advisors and regulators (together, "End Users"), provided that

- (a) UBS Delta Output is distributed to and used by its End Users only in connection with the Purpose,

- (b) UBS Delta Output to be distributed shall incorporate the notice contained in Annex E (Notice to be attached to all UBS Delta Output) to this Agreement, as updated from time to time upon notice from UBS, and any reference to UBS Delta Output shall be clearly accredited in writing to UBS Delta;
- (c) no alteration, amendment or addition is made by Client, its End Users or any other person to such UBS Delta Output and such UBS Delta Output is only distributed in full unabridged form;
- (d) such End User is a corporate or institutional client only,
- (e) such End User is not an investment bank or software producer,
- (f) to the best of Client's knowledge and belief, such End User has not developed and is not developing any product which is similar to or competes with UBS Delta, and
- (g) Client shall ensure that no such End User shall reproduce or distribute any such UBS Delta Output to any person.

3.26 Subject to clause **Hiba! A hivatkozási forrás nem található.** and clause 3.18 (which will for the avoidance of doubt take precedence of this right in respect of UBS Delta Output containing certain Market Data), Client may incorporate a reasonable amount of excerpts from UBS Delta Output ("Excerpts") in (i) its own materials or (ii) materials which it distributes to its End Users ("Client Materials"), provided that

- (a) the Excerpts are distributed to and used by its End Users only in connection with the Purpose, and
- (b) all references to UBS, including the notice contained in Annex E (Notice to be attached to all UBS Delta Output) to this Agreement and any UBS branding or logos, shall be removed from such Excerpts prior to distribution. Client accepts all responsibility for Client Materials and agrees that UBS shall have no responsibility whatsoever in respect of any Client Materials or any Excerpts therein

3.27 All other use of UBS Delta Output is prohibited. UBS shall have complete discretion to determine what constitutes UBS Delta Output and to notify Client at any time and without cause that Client is no longer permitted to distribute UBS Delta Output or Excerpts (whether or not such determination is consistent with previous determinations by UBS).

3.28 Except as expressly permitted in this Agreement, expressly stated on UBS Delta, expressly permitted by UBS or by applicable copyright law (subject to the terms and conditions set out in this Agreement), Client agrees it shall not reproduce, distribute, transmit, publish or otherwise transfer, modify, or commercially exploit the Services or any UBS Delta Output, methodology, software, file, data, information, communication or other content received or accessed through the Services or create any product derived from the Services. Any software or tools downloaded (or otherwise available through access to or use of the Services) may not be reverse engineered or otherwise tampered with unless specifically authorised by the owner of the rights in the software or tools or as is expressly provided by law.

4 Charges

- 4.1 Client shall observe the terms and conditions of this Agreement and, as applicable, pay to UBS the Charges
- 4.2 All Charges shall be exclusive of value added tax (VAT) which shall be paid by Client at the rate and in the manner for the time being prescribed by law.

4.3 The Charges will be invoiced periodically by UBS and Client shall pay all Charges due (other than any portion or part of the Charges that are being disputed by Client in good faith) within 30 days of the date of the applicable invoice without set-off or counterclaim. If Client does not pay any undisputed Charges in full by the due date, then Client shall pay interest on any unpaid charges at the rate of 4% above the base rate of Bank of England, accruing on a daily basis and compounded quarterly from the date payment was due until the date of actual payment.

5 Intellectual Property Rights

5.1 UBS warrants that it has the right to grant the licence set out in clause **Hiba! A hivatkozási forrás nem található.** All title, ownership rights and intellectual property rights in the Services, including but not limited to UBS Delta Output, UBS Delta methodology, shall remain in UBS and its licensors. Nothing on UBS Delta or any UBS Delta Output shall be construed as conferring any licence save as expressly set out herein of any of UBS's or any third party's intellectual property rights, whether by estoppel, implication or otherwise

5.2 Client warrants and represents to UBS that it has the right to

- (a) upload into UBS Delta and otherwise disclose to UBS, or
- (b) disclose to UBS and request UBS to upload into UBS Delta; and
- (c) use and redistribute in connection with the Services and the Purpose,

all data that Client uploads into UBS Delta or requests UBS to upload into UBS Delta (as applicable) or provides pursuant to the Services at any time during the term of this Agreement, including but not limited to portfolio and benchmark indices data, and that Client has obtained any and all licences, consents or permissions from any third party that may be required in respect of the same. All title, ownership rights and intellectual property rights in such Client data shall remain in Client or its licensors.

6 Term and Termination

Term

6.1 This Agreement shall commence on the Effective Date and shall continue in full force and effect for the Term and thereafter for such period (if any) agreed between the parties in writing (or, in the absence of any such agreement, until Client's access to UBS Delta or receipt of the Services is withdrawn by UBS), unless and until terminated in accordance with this clause **Hiba! A hivatkozási forrás nem található.**

Client's termination rights

- 6.2 Client shall be entitled to terminate this Agreement at any time without cause by giving to UBS such prior written notice as set out in Annex C (Service Profile)
- 6.3 Client shall be entitled to terminate this Agreement at any time on written notice to UBS if (i) UBS materially breaches any term of this Agreement; (ii) if UBS ceases or threatens to cease trading, is unable to pay its debts as they fall due or has a receiver, administrator, administrative receiver or liquidator appointed otherwise than pursuant to a solvent amalgamation or reconstruction, or (iii) pursuant to clause **Hiba! A hivatkozási forrás nem található.**

UBS's termination rights

- 6.4 UBS shall be entitled to terminate this Agreement at any time and without cause by giving to the Client such prior written notice as set out in Annex C (Service Profile).

6 5 UBS shall be entitled to terminate this Agreement immediately and without notice at any time: (i) if Client breaches any of the terms of this Agreement, (ii) if in UBS's opinion termination is necessary or desirable for technical reasons, (iii) to comply with Applicable Law or any governmental, legal, banking or any other regulatory requirement or request; (iv) if Client undergoes a change of control, where "control" includes direct or indirect control or (v) if Client ceases or threatens to cease trading, is unable to pay its debts or has a receiver, administrator, administrative receiver or liquidator appointed or calls a meeting of its creditors or ceases for any other reason to carry on business or does anything analogous in another jurisdiction or in UBS's reasonable opinion any of these events appears likely.

Consequences of Termination

6 6 If this Agreement expires or is terminated:

- (a) UBS shall be entitled to disable all of Client Users' passwords and so deny Client and all Client Users access to UBS Delta;
- (b) UBS shall be entitled to immediately cease providing the Services;
- (c) Client shall promptly pay to UBS any unpaid Charges which relate to the period prior to termination, calculated on a pro-rata basis;
- (d) solely where this Agreement is terminated by UBS pursuant to clause Hiba! A hivatkozási forrás nem található., or clause Hiba! A hivatkozási forrás nem található.(ii) or (iii), or by Client pursuant to clause Hiba! A hivatkozási forrás nem található., UBS shall refund to Client any Charges paid in advance which relate to the period following termination; and
- (e) Client shall, if requested by UBS, return to UBS, or at UBS's option destroy, all copies, whether hard copy or electronic, of all UBS Delta training manuals, explanations of UBS Delta methodology and materials relating to any UBS Delta training workshops, together with such other information relating to the Services as UBS may require, but excluding all information relating to Client's fund management portfolio, except any copies which Client is required to retain for legal or regulatory purposes.

6 7 Clauses Hiba! A hivatkozási forrás nem található., Hiba! A hivatkozási forrás nem található., Hiba! A hivatkozási forrás nem található., Hiba! A hivatkozási forrás nem található., Hiba! A hivatkozási forrás nem található. and Hiba! A hivatkozási forrás nem található. shall survive termination of this Agreement.

7 Warranty and Liability Exclusion of warranties

7 1 Subject only to clause Hiba! A hivatkozási forrás nem található., the Services, including, without limitation, content and features of the Services, are provided on an "as is" and "as available basis" at Client's sole risk and without representations or warranties of any kind. All warranties, conditions or terms (express or implied, statutory or otherwise including without limitation any warranty as to satisfactory quality, merchantability, fitness for a particular purpose and without any warranties or commitments that access or use will be uninterrupted or error free) other than those expressly set out in this Agreement are expressly excluded. Notwithstanding any other provision of this Agreement, UBS does not provide any guarantee that the Services shall be defect free or of availability in respect of the Services and UBS shall have no liability to Client or any other person for any failure to provide the Services.

UBS's liability.

7 2 UBS will accept liability without limit for: (i) death or personal injury caused by its negligence or the negligence of its employees acting in the course of their employment, (ii) any fraudulent pre-contractual misrepresentations made by UBS on which Client can be shown to have relied, and (iii) any other liability which by law UBS cannot exclude, and nothing in this Agreement shall limit any such liability. This does not in any way confer greater rights than Client would otherwise have at law

7 3 Subject to clause Hiba! A hivatkozási forrás nem található., UBS will accept liability for loss or damage arising out of any breach of this Agreement or any tort (including negligence) committed by UBS in connection with this Agreement provided that UBS's liability to pay damages will not exceed the Liability Cap set out in Annex C (Service Profile) (in aggregate).

7 4 In no event shall UBS be liable for:

- (f) any loss of goodwill, reputation or opportunity, any loss of revenue or profits, any loss of anticipated savings, or any loss of or corruption of data;
- (g) any loss or damage arising out of any breach of this Agreement on the part of the Client;
- (h) any loss or damage arising out of any error by the Client or any Client User in inputting the Client's data into UBS Delta or otherwise manipulating the Client's data in connection with the Services; or
- (i) any other Client or Client User error and any Client hardware or system faults or failures;

in each case of the foregoing (a) - (d) whether direct or indirect; or

- (j) any indirect or consequential loss or damage,

which in each case of the foregoing, arises out of or in connection with this Agreement or any breach or non-performance of this Agreement no matter how fundamental (including by reason of UBS's negligence) whether or not UBS had been informed of or was aware that there was a serious possibility of such loss

7 5 Any legal proceedings arising from this Agreement must be brought within: (a) 3 years from the date when the party bringing the proceedings first becomes aware or ought reasonably to have become aware of the facts which give rise to the liability or alleged liability, or (b) any relevant statutory limitation period, or (c) 3 years from the date of termination of this Agreement, whichever is the earlier. Client will not, under any circumstances, bring any claims of any nature (whether in tort (including negligence) or contract or otherwise) against any of UBS' individual directors, officers, employees, contractors or agents where such claims arise out of or in relation to the subject matter of this Agreement.

7 6 Clauses Hiba! A hivatkozási forrás nem található. to Hiba! A hivatkozási forrás nem található. above set out UBS's entire liability in respect of this Agreement and to the extent permissible by law, UBS will have no further liability for any loss or damage however caused arising under or in connection with this Agreement or in connection with Client's use of the Services whether in contract, tort or otherwise.

Force Majeure

7 7 Notwithstanding any other provision of this Agreement, UBS shall not be considered in breach of this Agreement in the event of any failure or delay for reasons not within UBS's reasonable control, including, without limitation, acts of nature, power failure, labour stoppage, unrest or disputes, failure resulting from upgrading or servicing of equipment or systems, acts or omissions of Client or any third party.

Disclaimer

7.8 The Services rely on market data which may be inaccurate, out of date or unavailable at any time, and uses technology, algorithms and processes which may suffer from bugs or errors and/or may not deliver accurate or their intended results. Client is responsible for checking and verifying the accuracy of its portfolio positions or other information that it has uploaded and downloaded to and from UBS Delta. Any reliance placed on the Services or any UBS Delta Output is done so entirely at Client's risk.

7.9 The Services are provided solely for Client's benefit and use in accordance with the terms of this Agreement. UBS accepts no liability or responsibility to any third party who benefits from or gains access to the Services, or any UBS Delta Output, whether:

- (a) as a result of any breach of Client or Client User of any of its obligations under this Agreement without the express consent of UBS;
- (b) pursuant to clause Hiba! A hivatkozási forrás nem található., or
- (c) otherwise

7.10 Use of the Services and any information available on or through the Services is subject to the Disclaimer set out in Annex F (Disclaimer) as may be updated, replaced or amended from time to time by UBS

Client Indemnity

7.11 Client agrees to indemnify UBS and its Affiliates and its and their directors and employees ("Indemnified Persons") on demand against any liabilities, losses, claims, damages, expenses or other costs (including, but not limited to, legal fees) arising out of or relating to:

- (a) any fraud, breach of Applicable Law, or wilful default by Client;
- (b) any breach by Client of clause Hiba! A hivatkozási forrás nem található.;
- (c) any breach by Client of clause Hiba! A hivatkozási forrás nem található.;
- (d) any infringement of any third party's intellectual property rights as a result of any material provided by Client to UBS, uploaded into UBS Delta or copied or used in connection with the Services; and
- (e) any act or omission by any Authorised Affiliate which, if committed by Client, would give rise to a claim under this Agreement but is otherwise avoided by virtue of that Authorised Affiliate not being a party to this Agreement.

8 Confidentiality

8.1 In this Agreement:

"Confidential Information" means any and all information disclosed (whether before, on or after the date of this Agreement; whether verbally, in writing, electronically or by any other means, whether directly or indirectly and whether or not marked "Confidential") by the Disclosing Party or any person on its behalf to the Receiving Party or otherwise obtained by the Receiving Party or any person on its behalf from the Disclosing Party, including, but not limited to any information relating to the Disclosing Party's business affairs, operations, products, processes, methodologies, formulae, plans, intentions, projections, know-how, intellectual property rights, trade secrets, market opportunities, clients, customers, marketing activities, sales, software, computer and telecommunications systems, costs and prices, usage rates, records, finances and personnel. For the avoidance of doubt, UBS's Confidential Information includes, without limitation, all information relating to the Services (including UBS Delta passwords and the contents of this Agreement itself) and Client's Confidential Information includes, without limitation Confidential Portfolio Information.

"Confidential Portfolio Information" means information relating to Client's fund management portfolio and benchmark constituents, which Client provides to the UBS Delta Team only;

"UBS Delta Team" means the specific UBS Delta department within UBS,

"Disclosing Party" means a party disclosing Confidential Information; and

"Receiving Party" means a party receiving Confidential Information

8.2

(a) Without prejudice to clauses Hiba! A hivatkozási forrás nem található.(b) and Hiba! A hivatkozási forrás nem található.(c), each party agrees to keep the other party's Confidential Information confidential, to ensure that its directors and employees keep the other party's Confidential Information confidential and not disclose such Confidential Information to another person except as permitted in clause Hiba! A hivatkozási forrás nem található. and Hiba! A hivatkozási forrás nem található. of this Agreement.

(b) UBS agrees that, subject to clause Hiba! A hivatkozási forrás nem található., Client's Confidential Portfolio Information will only be reviewed by members of the UBS Delta Team, provided that nothing in this clause Hiba! A hivatkozási forrás nem található.(b) shall prevent or restrict UBS from disclosing such Client Portfolio Information to those of its employees (for example audit and information technology personnel) and contractors who need to have access to such information for the purposes of UBS's development and operation of the Services

(c) Client agrees that, subject to clause Hiba! A hivatkozási forrás nem található., it will not disclose any of UBS's Confidential Information where it pertains to the Services, except that Client shall be permitted to disclose such information: (i) to any Client User (provided that Client shall ensure that the Client Users shall keep the UBS Confidential Information confidential), (ii) where it constitutes UBS Delta Output, pursuant to clause Hiba! A hivatkozási forrás nem található.; or (iii) that is a general description of the purpose and features of UBS Delta, to those of its directors and employees who reasonably need to know such information in connection with the Purpose

8.3

Each party may disclose the Confidential Information of the other party:

- (a) with the prior written consent of the other party; or
- (b) where disclosure is required or requested by law; by a court of competent jurisdiction or by any regulatory body which regulates the conduct of the Receiving Party; provided that the Receiving Party shall give the Disclosing Party as much notice as is practicable of any such requirement or request and shall not disclose any more Confidential Information than is reasonably necessary in the circumstances

8.4

UBS may disclose Confidential Information that is personal data relating to Client Users or general data relating to Client's Use of the Services which has been collected in accordance with clauses Hiba! A hivatkozási forrás nem található. and Hiba! A hivatkozási forrás nem található., to third parties solely in accordance with clause Hiba! A hivatkozási forrás nem található.

8.5

This clause Hiba! A hivatkozási forrás nem található. does not apply to Confidential Information which

- (a) is in the public domain and was publicly available prior to the Receiving Party's receipt thereof from the Disclosing Party,
- (b) the Receiving Party can show was in its possession prior to disclosure by the Disclosing Party and which had not previously been obtained from the Disclosing Party or another person under an obligation of confidence to the Disclosing Party,

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- (c) the Receiving Party obtains from a person other than the Disclosing Party, other than in breach by such person of any obligation of confidence to the Disclosing Party; or
- (d) the Receiving Party can show was independently developed by the Receiving Party, without the benefit of any Confidential Information of the Disclosing Party.

- 8.6 The Receiving Party shall within 7 days following receipt of a written request from the Disclosing Party return to the Disclosing Party, or at the Disclosing Party's option destroy, all documents, electronic storage media and other materials in its possession, custody or control which contain any of the Disclosing Party's Confidential Information, and certify to the other party that this has been done. This clause shall not apply to the extent which the Receiving Party is required to retain any Confidential Information for legal or regulatory reasons
- 8.7 Except as expressly set out in this Agreement, nothing contained in this Agreement shall be construed as granting any right or licence to either party's Confidential Information or to any invention or discovery derived from or improvement made to such Confidential Information, whether conceived or created prior to or after the date of this Agreement.
- 8.8 Neither party makes any representation or warranty, express or implied, with respect to the Confidential Information. Except as provided in this Agreement, neither party is liable to the other party or another person in respect of the Confidential Information or its use
- 8.9 Each party acknowledges that breach by it of this clause **Hiba! A hivatkozási forrás nem található.** may cause irreparable injury to other party, which injury will be inadequately compensated by damages. Accordingly each party is entitled to the remedies of injunction, specific performance and other equitable relief in respect of any actual breach or threatened breach of the terms of this clause **Hiba! A hivatkozási forrás nem található.**, in addition to any other legal remedies which may be available.
- 8.10 Notwithstanding any other provision of this Agreement, UBS and Client (unless otherwise requested by either party) may each disclose to third parties the fact that Client is a user of UBS Delta

9 Relationship with UBS

- 9.1 Client acknowledges and agrees that the provision by UBS to Client of the Services represents a discrete service provided by UBS to Client, the provision of which does not confer or imply any change to any services (including, but not limited to sales coverage, research provision or pricing/execution services) provided by UBS to Client, nor the separate terms and conditions upon which those services are provided, whether before, concurrent with or after the provision of the Services to Client.

10 General

- 10.1 UBS shall be entitled to transfer its rights and obligations under this Agreement to any Affiliate of UBS and any entity established or authorised to take over all or part of the Services and/or UBS's business. Client shall not be entitled to transfer any or all of its rights and obligations under this Agreement.
- 10.2 Subject to clause **Hiba! A hivatkozási forrás nem található.** above, no delay by either party in enforcing any of the terms or conditions of this Agreement will affect or restrict the other party's rights and powers arising under this Agreement. No waiver of any term or condition of this Agreement will be effective unless made in writing
- 10.3 Any amendments to this Agreement will not be effective unless agreed in writing and signed by both parties, except that UBS may update this Agreement upon at least 30 days' written notice

(unless a shorter notice period is required to comply with Applicable Law in which case UBS shall give reasonable notice). In the event that Client does not agree to such updated Agreement, Client may, prior to the expiry of such notice period, serve notice on UBS to terminate this Agreement immediately.

10.4 This Agreement constitutes the entire agreement between the parties and supersedes any prior agreement or arrangement in respect of its subject matter and:

- (a) neither party has entered into this Agreement in reliance upon, and it shall have no remedy in respect of, any representation or statement (whether made by the other party or any other person) which is not expressly set out in this Agreement,
- (b) the only remedies available for breach of any representation or statement which was made prior to entry into this Agreement and which is expressly set out in this Agreement shall be for breach of contract; and
- (c) nothing in this clause **Hiba! A hivatkozási forrás nem található.** shall be interpreted or construed as limiting or excluding the liability of either party for fraud or fraudulent misrepresentation

10.5 If any provision of this Agreement is determined to be invalid or unenforceable, in whole or in part, the remaining provisions will continue in full force and effect as if this Agreement had been executed without the invalid provision

10.6 UBS and Client acknowledge and agree that the notification requirements of the E-Commerce Directive (2000/31/EC), as implemented in the United Kingdom by the Electronic Commerce (EC Directive) Regulations 2002; are excluded to the fullest extent permissible by law

10.7 The headings in this Agreement do not form part of the Agreement. The annexes to this Agreement form part of this Agreement.

10.8 This Agreement shall be binding upon and inure for the benefit of each party hereto and its subsequent successors, permitted transferees and lawful assigns.

10.9 No variation of this Agreement shall be effective unless it is in writing and signed by the parties (or their authorised representatives) or (if applicable) accepted electronically in the same manner as this Agreement.

10.10 Any notice given pursuant to the provisions of this Agreement shall, unless otherwise specified in this Agreement, be in writing and may be given by delivery by hand or facsimile, by certified mail return receipt requested, or by email, and shall be addressed to:

- (a) in the case of Client the address specified above, or in the case of email, the email address of any Client User, and
- (b) in the case of UBS, Head of UBS Delta, UBS AG, 1 Finsbury Avenue, EC2M 2PP, Facsimile +44 20 7568 4800, with a copy to Head of IT Contracting & Shared Services Legal, UBS, 1 Finsbury Avenue, London, EC2M 2PP, Facsimile: +44 20 7568 7168, or by email to delta@ubs.com

Notices and communications shall be addressed as indicated unless either the Client or UBS has notified the other in writing of a change. Notices and communications shall be effective upon receipt (in the case of email, upon receipt by the recipient party's public facing email server)

10.11 In this Agreement:

- (a) the singular shall include the plural and vice versa,

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- (b) any reference to "in writing" or "written" shall include written or produced by any legible and non-transitory substitute for writing, including electronic form;
- (c) any phrase introduced by the terms "including", "in particular" or any similar expression shall be construed as illustrative and shall not limit the sense of the words preceding those terms,
- (d) the clause headings in this Agreement are included for convenience only and do not affect the interpretation of this Agreement

10.12 This Agreement and any non-contractual obligations arising out of it is/are governed by and will be construed in accordance with the laws of England and in the event of dispute arising out of or in relation to this Agreement or its formation the English Courts will have exclusive jurisdiction.

**Annex B
Charges**

All Charges (unless specified) are quoted in EUR and apply annually

The Charges are comprised of the constituent elements of the Services that the Client, in agreement with UBS, has elected to use.

1. UBS Delta Website access

1.1 Core offering

The UBS Delta core offering comprises use of the web application for an agreed number of Client Users

Core functional modules include

- Breakouts
- Cashflows
- Market Analytics
- Pool Monitor
- Risk (including Scenarios, Parametric risk, Historical VaR)
- Return Attribution
- Optimiser & Hedge Calculator

Charging for the core offering is reflected in a per-user, per-annum charge as follows:

For non-admin users:

Max number of users (band)	Annual Charge		Charge per extra user until next band	
	Service Profile 1	Service Profile 2	Service Profile 1	Service Profile 2
1	37,000	90,000	12,000	15,000
5	85,000	150,000	8,000	10,000
15	165,000	250,000	6,400	8,000
25	229,000	330,000	5,600	7,000

(For example 24 users under service profile 2 would be charged 250k (15 user band) + 9*8k (9 extra users) = 322k EUR)

Admin users

Service profile 1 – 5.6k/admin user

Service profile 2 – 7k/admin user

An admin user is a Client User solely concerned with the maintenance of the data input into UBS Delta and/or the administration of user permissions and preferences and/or the support of a client's IT infrastructure. Client must not allow the access as an admin user for any other purpose. Client's Users are only eligible to be charged at admin user rates if agreed in advance with UBS.

Client's number of Maximum Users is recorded in the UBS DELTA™ Use Agreement Term Sheet. Extra users requested from time to time are at the discretion of UBS and will be priced as above. Where the agreed number of extra users reaches the next band, it will be priced based on that band unless otherwise agreed.

1.2 Premium functionality

Premium functionality is categorised by asset class and by functional module. UBS may also agree to provide access to Client to certain premium functionality of UBS as follows:

Functional Modules

Module	Charge
CVA	Subject to separate agreement
Rules Engine	Subject to separate agreement
Equity Research	Subject to separate agreement
Extract of Curve Data	Subject to separate agreement

Asset Classes

Asset Class Group	Charge
Structured Credit	50k
Other Structured (incl multi-asset hybrid, str libor)	10k trade

Clients on Service Profile 1 are charged at 50% of the above Charges

All purchased premium functionality is enabled for all relevant Client Users

Given the constantly evolving nature of the UBS Delta service, the list and price of premium functionality offerings is subject to change

2. UBS Delta Reporting

UBS Delta offers clients the optional service of the scheduled running of standard reports, and building and scheduled running of customised reports, bespoke to the client

Scheduled reporting is only available to clients on Service profile 2

Charging for the reporting offering is divided into three parts:

- (i) A per-annum, per-report charge, incorporating the frequency of running (small reports),
- (ii) A per-annum, per-report charge, incorporating the frequency of running (large reports);
- (iii) A per-bespoke building charge, that factors in the cost of building of the customised report

Reports are subject to an aggregate reporting charge per annum. Further details are set out below

2.1 Reporting

Scheduled Report Running

Pricing is per Report

i) For Reports run on no more than 10k positions and for no more than 20 portfolios ("Small Reports")

Frequency	Off-Peak	Peak
Daily	6000	12000
Weekly	2500	5000

Monthly	1000	2000
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The first weekly off-peak small report and first monthly off-peak small report are not chargeable

ii) For Reports run on more than 10k positions and/or where number of portfolios exceeds 20 ("Large Reports")

Frequency	Off-Peak	Peak
Daily	30,000	60,000
Weekly	12,500	25,000
Monthly	5,000	10,000

iii) High Usage Minimums

Clients running Large Reports are subject to a 100k minimum aggregate reporting charge per annum.

Clients are subject to a 100k minimum aggregate reporting charge per annum if the aggregate number of unique portfolios on which Reports are run exceeds 50 portfolios.

iv) Off-Peak/Peak

Peak Reports are scheduled to start running before 12:00 GMT.

Off-peak Reports are scheduled to start running between 12:00 GMT and midnight GMT

2.2 Bespoke Report Building

Daily rate of 3k/day – estimated in advance.

3. Additional Services

As agreed from time to time. Subject to separate agreement

Annex C
Service Profile

Service Profile 1:

1. Background

This Service Profile applies to Clients who use the Services for investment decision support purposes only but not as part of their compliance and control infrastructure. Provisions concerning scope, changes, termination and liability have been agreed accordingly as follows

2. Scope of Use

- 2.1 Client may use the Services for investment decision support purposes only (the "Purpose") (but not for the avoidance of doubt for its compliance and control infrastructure)
- 2.2 Without prejudice to the applicability of other terms and conditions set out herein, Client's attention is specifically drawn to clause **Hiba! A hivatkozási forrás nem található.** of Annex A (UBS DELTA™ Terms of Use)

3. Changes

- 3.1 UBS shall be entitled to revise any or all aspects of the Services at any time at its sole discretion. UBS shall give Client as much notice as reasonably practicable of any significant changes to the functionality of the Services

4. Termination

- 4.1 Either party may terminate this Agreement on one week's written notice to the other at any time

5. Liability

- 5.1 UBS's Liability Cap for the purposes of clause **Hiba! A hivatkozási forrás nem található.** of Annex A (UBS DELTA™ Terms of Use) shall be the greater of the Charges paid by Client in the 12 months prior to the event giving rise to the claim first occurring, and £10,000

Service Profile 2:

Background

This Service Profile applies to Clients who use the Services for a fee including as part of their compliance and control infrastructure. Provisions concerning scope, changes, termination and liability have been agreed accordingly as follows:

2. Scope of Use

- 2.1 Client may use the Services for:

- 2.1.1 investment decision support purposes,
2.1.2 risk analysis and reporting; and
2.1.3 performance attribution,

including as part of its compliance and control infrastructure,

the ("Purpose").

- 2.2 Without prejudice to the applicability of other terms and conditions set out herein, Client's attention is specifically drawn to clause **Hiba! A hivatkozási forrás nem található.** of Annex A (UBS DELTA™ Terms of Use)

3. Changes

- 3.1 UBS shall be entitled to revise any or all aspects of the Services at any time at its sole discretion. UBS shall give Client as much notice as reasonably practicable of any significant changes to the functionality of the Services.

4. Termination

- 4.1 Either party may terminate this Agreement on 3 months' written notice to the other at any time

5. Liability

- 5.1 UBS's Liability Cap for the purposes of clause **Hiba! A hivatkozási forrás nem található.** of Annex A (UBS DELTA™ Terms of Use) shall be the greater of 125% of the Charges paid by Client in the 12 months prior to the event giving rise to the claim first occurring, and £70,000.

Annex D
Market Data

UBS DELTA™ Market Data Terms and Conditions

1. By accessing and using the Services, and/or pursuant to the UBS DELTA™ Use Agreement, Client is subject to these UBS DELTA™ Market Data Terms and Conditions and the Client Portal Market Data Terms of Use at http://clientportal.swissbank.com/ibol_open/marketdata.htm (in each case as may be updated by UBS from time to time).
2. In these UBS DELTA™ Market Data Terms and Conditions, defined terms and conditions shall have the meanings given to them in, and these Terms and Conditions shall otherwise be construed in accordance with, the UBS DELTA™ Use Agreement.
3. By accessing and using the Services and pursuant to the UBS DELTA™ Use Agreement, Client agrees that
 - (a) UBS may terminate the provision of any Market Data at any time with or without notice;
 - (b) UBS may notify any Market Data Vendor that Client is a recipient of such Market Data Vendor's Market Data;
 - (c) Client shall use Market Data for its internal purposes only and shall not redistribute Market Data to any third party, except:
 - i. where the Market Data is used to produce UBS Delta Output (as defined in clause 3.25 of Annex A of the UBS DELTA™ Use Agreement and the Market Data does not remain identifiable or may be readily extracted from the UBS Delta Output; and
 - ii. where Client is not restricted from doing so by any other term or condition of these UBS DELTA™ Market Data Terms and Conditions;
 - (d) to the fullest extent permitted by law, neither UBS nor any Market Data Vendor shall be liable for the inaccuracy or incompleteness of any Market Data, for any delay or interruption in the supply of any Market Data or for any loss or damage however caused arising in connection with any Market Data, including without limitation any indirect, special or consequential loss and loss of profits;
 - (e) all title, ownership rights and intellectual property rights in or relating to any Market Data shall remain in UBS or the relevant Market Data Vendor;
 - (f) Client shall strictly comply with any restrictions on use or distribution of Market Data, including but not limited to geographic restrictions, which may be contained in any such Market Data or otherwise notified to it from time to time or made available through the Services or set out below, and
 - (g) where UBS agrees to provide Market Data subject to the Client having in place a direct licence with the provider of that Market Data, Client will maintain such licence at all times and shall notify UBS immediately if such licence expires, is terminated, revoked or suspended or Client otherwise does not have the right to receive or use such Market Data.
4. The order of precedence in case of any conflicting terms and conditions or disclaimers in respect of Market Data shall be as follows (from highest precedence to lowest precedence)

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- (k)
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- (l)
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- (m)
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- (f) Markit may request UBS Delta to terminate the Customer's access to the Markit CDS Data, in the event of the termination of any agreement between Customer and Markit for the Markit CDS Data and/or for any material breach by Customer of any term relating to the use of the Markit CDS Data
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Annex E
Notice to be attached to all UBS Delta™ Output

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Annex F
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