

# 3<sup>rd</sup> Year Industrial Placement at Deutsche Bank

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# Deutsche Bank

- Major international bank.
- Operates as an investment bank in the UK.
- London subsidiary: originally Morgan Grenfell.



# Legal, Risk & Capital IT

- IT solutions provider for Legal, Risk & Capital.
- Deutsche Bank is regulated by institutions such as:
  - BaFin (German).
  - FSA (British).
- Deals with areas such as:
  - Compliance.
  - Market Risk.
  - Credit Risk.
- Growing recently due to tighter regulation.



# My Projects

- User interface for Value at Risk data platform.
- Comprehensive Risk Measure reporting.
- Exposure / sensitivity / position reporting.
- Idiosyncratic risk data preparation.

# VaRData UI

- Value at Risk (VaR): loss on 5% worst days = ?
- New system to prepare VaR data:
  - Fresh, mostly back-end project when I arrived.
  - My task: the user interface.
- Benefits of having a UI early:
  - Users can easily suggest new features.
  - Progress easy to see; speeds up development.
- Technologies: Java, GWT/GXT.

# VaRData UI (II)

## VaRData

GPC2

Static Data

Risk Representation Types

Risk Representation Reference

Exchange Rates

Underliers

Tenor Maturity Mappings

Market Data Files

Scenario Sets

Scenario Objects

VaR Books

VaR Books

Exchange Rates

VaR Books

Tenor Maturity Mappings

Scenario Sets

Scenario Objects

Sensitivities / Positions

Schedule Enrichment

Schedule Enrichment

Book	Location	Subsidiary	COB Date	Report Status	Market Data	State	Progress	Faults
GR_CR_EUR_OPT_HYB_HYB	GREAT BRITAIN	AG LONDON	04-Aug-2010	OFFICIAL	5593599	Enriched	3/3	0

Market Data ID: 5593599, Status: OFFICIAL on 04-Aug-2010

All Exposures

Faulty Exposures

Sensitivities

Workflow Events

Explore Sensitivities

RR Type	Currency	Underlying	ref1	ref2	Amount	Amount USD	FX Rate	sensSe
IR_BP_V_SW	JPY	V1.INTRATE.JPY.SWAP.PAR~V1.B.INTRATE.JPY.SWAP.PAR	Y10	N/A	3,484,110	40,365	86.3150	SW
IR_BP_V_SW	JPY	V1.INTRATE.JPY.SWAP.PAR~V1.B.INTRATE.JPY.SWAP.PAR	Y15	N/A	-16,205,239	-187,745	86.3150	SW
IR_BP_V_SW	JPY	V1.INTRATE.JPY.SWAP.PAR~V1.B.INTRATE.JPY.SWAP.PAR	Y20	N/A	9,322,669	108,008	86.3150	SW
IR_BP_V_SW	JPY	V1.INTRATE.JPY.SWAP.PAR~V1.B.INTRATE.JPY.SWAP.PAR	Y30	N/A	-601,116	-6,964	86.3150	SW
IR_GAMMA_SW	NOK	V1.INTRATE.NOK.SWAP.XDB.PAR~V1.B.INTRATE.NOK.SWAP.XDB.PAR	M01	M01	-85	-14	5.9981	SW
IR_BP_V_SW	NOK	V1.INTRATE.NOK.SWAP.XDB.PAR~V1.B.INTRATE.NOK.SWAP.XDB.PAR	M01	N/A	-1,091	-182	5.9981	SW
IR_BP_V_SW	NOK	V1.INTRATE.NOK.SWAP.XDB.PAR~V1.B.INTRATE.NOK.SWAP.XDB.PAR	M02	N/A	-668	-111	5.9981	SW
IR_BP_V_SW	NOK	V1.INTRATE.NOK.SWAP.XDB.PAR~V1.B.INTRATE.NOK.SWAP.XDB.PAR	M03	N/A	6,289	1,048	5.9981	SW
IR_BP_V_SW	NOK	V1.INTRATE.NOK.SWAP.XDB.PAR~V1.B.INTRATE.NOK.SWAP.XDB.PAR	M06	N/A	3,902	651	5.9981	SW
IR_BP_V_SW	NOK	V1.INTRATE.NOK.SWAP.XDB.PAR~V1.B.INTRATE.NOK.SWAP.XDB.PAR	M06	N/A	4,004	677	5.9981	SW

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# Comprehensive Risk Measure (CRM)

- Based on a Monte Carlo method.
- Need software to report aggregated CRM (pivot table).
- In-memory aggregation used.
- Used proprietary OLAP framework.
  - Initial exploration phase needed.
  - Results of this are on Confluence.
  - Next: correct / clean implementation.
- Technologies: Java, ActivePivot.



# E/S/P Reporting Tool

- Source: DB Market Risk management tool.
- Report data – again, aggregated in-memory – on:
  - Exposures.
  - Sensitivities.
  - Positions.
- High data volume - performance tuning needed:
  - Code tweaks (discovered by profiling).
  - JVM options.
- Technologies: Java, ActivePivot.



# IdioParameters Assignment

- Idiosyncratic risk measures:
  - Risk due to specific properties of security.
  - Upstream system: data for 2, 7 & 10 year time frames.
  - Interpolation needed for other durations.
- Data has to be found using security properties:
  - Rating, currency, country.
  - If not found, relax criteria to get a match.
- Current process (PL/SQL):
  - Entire batch of calculations takes 14 hours.

# IdioParameters Assignment (II)

- Improved process (Java Stored Procedure):
  - Much functionality can be written more efficiently.
  - Caching used to optimise performance.
  - Processing time now: about 10 minutes.
- Later also extended a UI to display these values.
- Technologies: Java, Oracle, GWT/GXT.

# Learned Competencies

- Ability to adapt to new environments.
- Confidence to work with teams in industry.
- Improved ability to collaborate.
- Business awareness in financial services.

# Learned Technical Skills

- Maven.
- Google Web Toolkit.
- Oracle – esp. stored procedures.
- In-Memory Aggregators / OLAP.
- Spring: Beans, Integration.
- Profiling.
- Clojure.



# Relevant DoC Courses

- 2<sup>nd</sup> Year:
  - Software Engineering: Design.
  - Complexity & Computability.
  - Algorithms.
- 3<sup>rd</sup> Year:
  - Distributed Systems.
  - Advanced Databases.
  - Simulation & Modelling.

Questions?