3rd Annual European Credit Risk Conference – Vienna, Austria - May 2010

The Role of Technology in Credit Risk Management

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Topics and Challenges

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- The case for front-to-back alignment
- Computational challenge: More calculations, faster
- Manage data complexity and volume
- System design for change
- Stressing systems and models
- Operational resilience

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Technology front-to-back alignment

Front To Back Alignment

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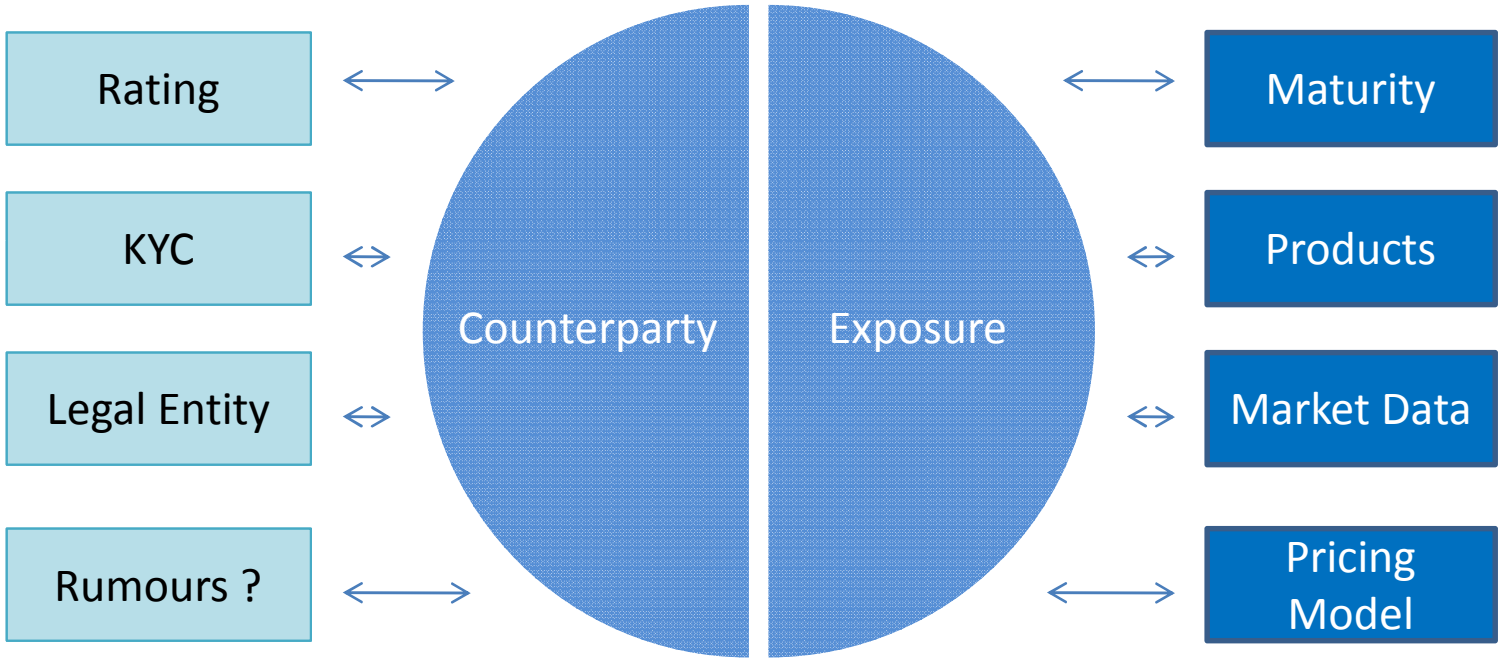
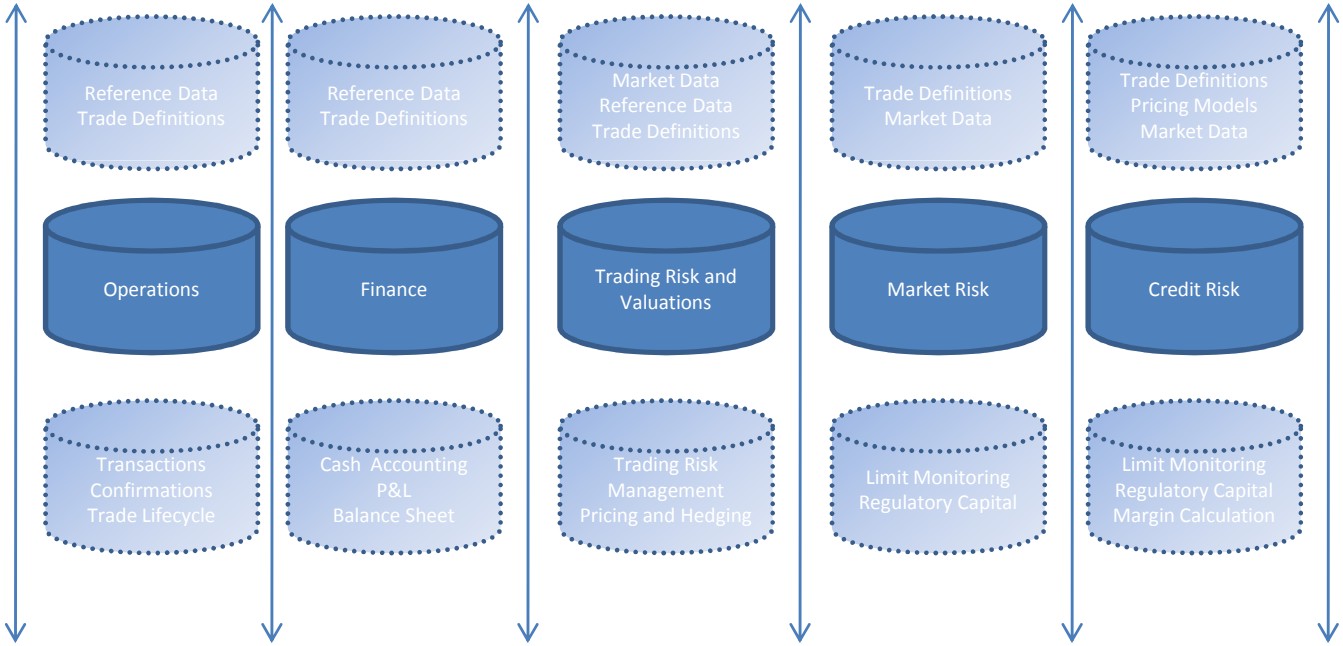
- Credit Risk – impacted by all aspects of trading operation
- Credit Derivatives increase convergence of Market Risk / Credit Risk



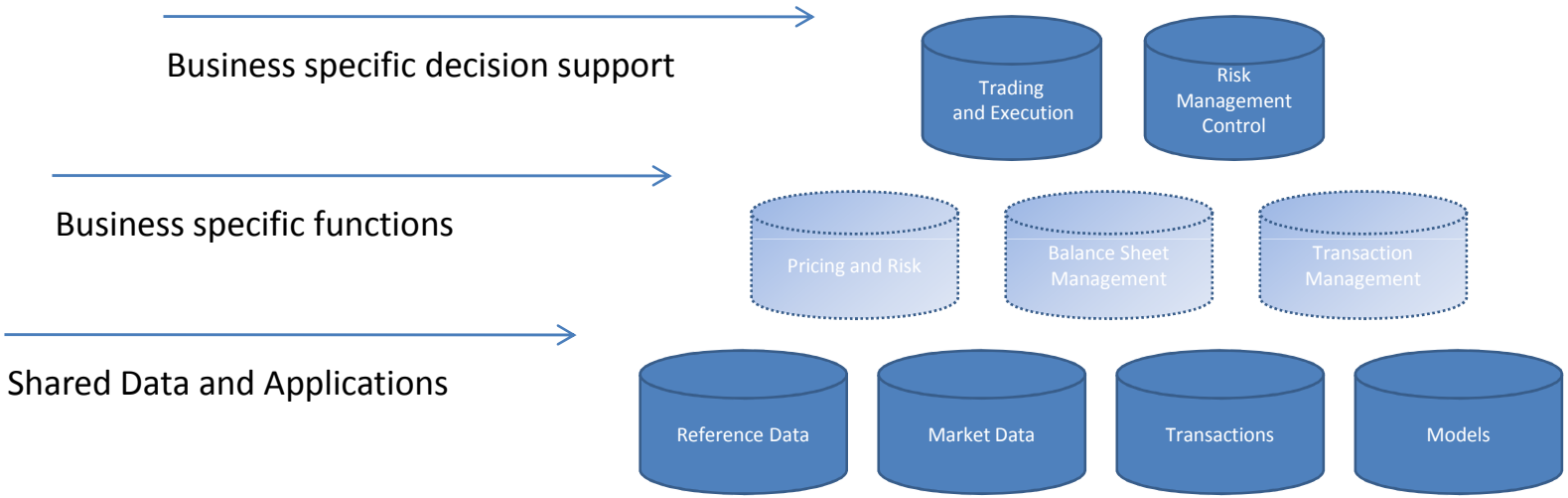
Front To Back Alignment

- Vertically aligned application stacks are attractive due to isolation of systems changes and dedicated functionality
- Vertically aligned application stacks make cross-functional changes difficult
- Organisations *avoiding* cross-functional changes *create* cross operational *risk*



Front To Back Alignment

- Horizontally aligned system architectures promote consistency ...
- .... but also provide management challenges



- Front-To-Back Alignment is the realisation that no single aspect of the business process can be changed without assessing the impact on the entire process
- This is done to reduce risk and increase benefit of change

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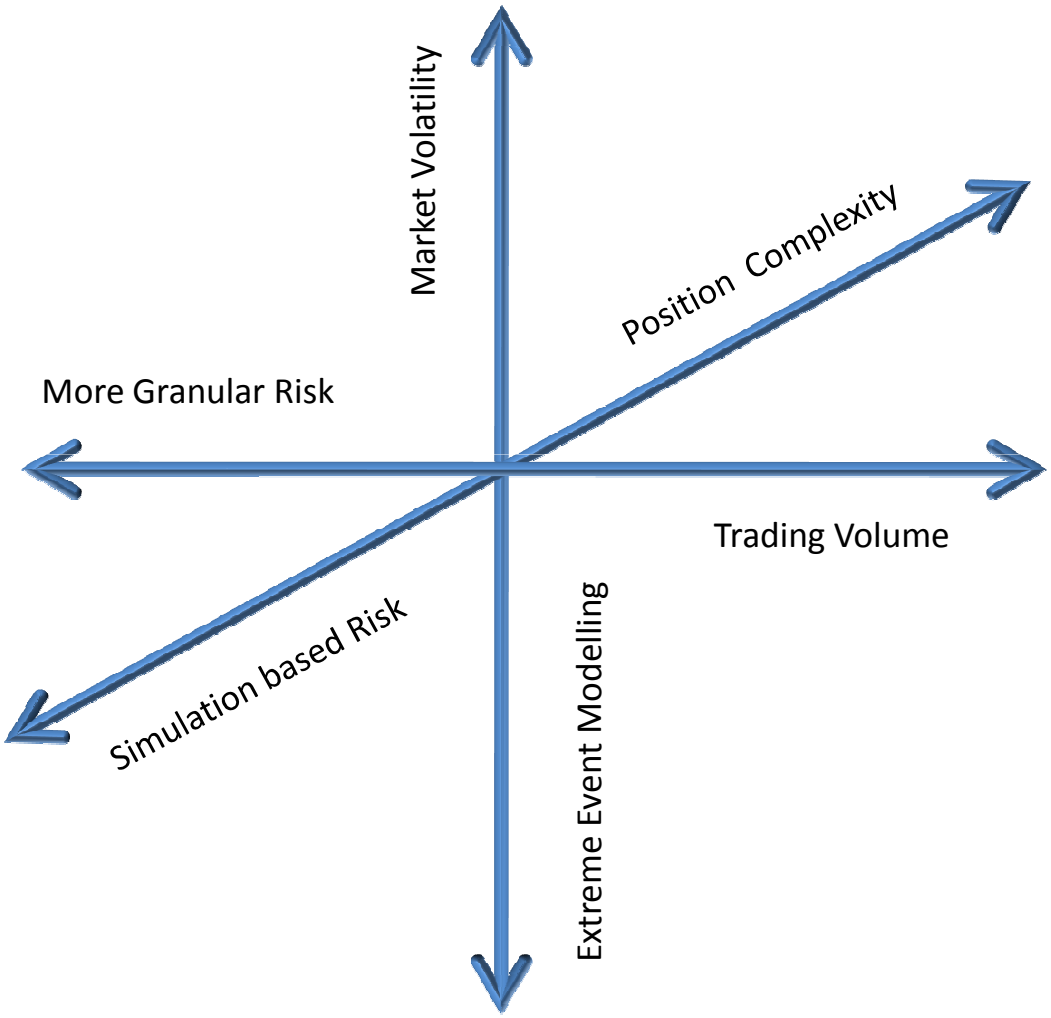
The Computational Challenge – More Calculations, Faster !

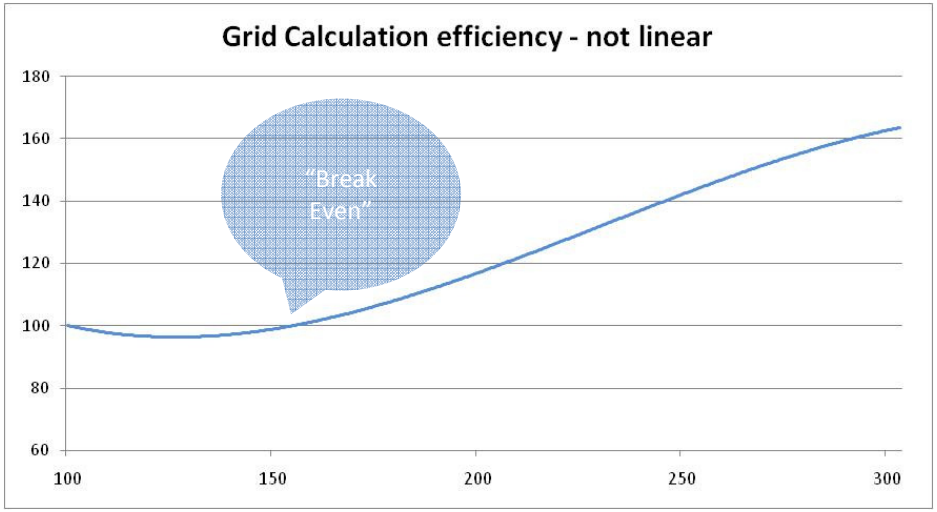
Computational Challenge

- Explosion of computation ask for risk management
- 2008/2009 market events create increased demand for “event based” modelling using full scenario approach
- Trading decisions increasingly require instant risk assessment
- Add this to existing use of Monte Carlo models for risk ...



Computational Challenge

- Grid Computing – common solution to increased calculation needs



Schematic Illustration

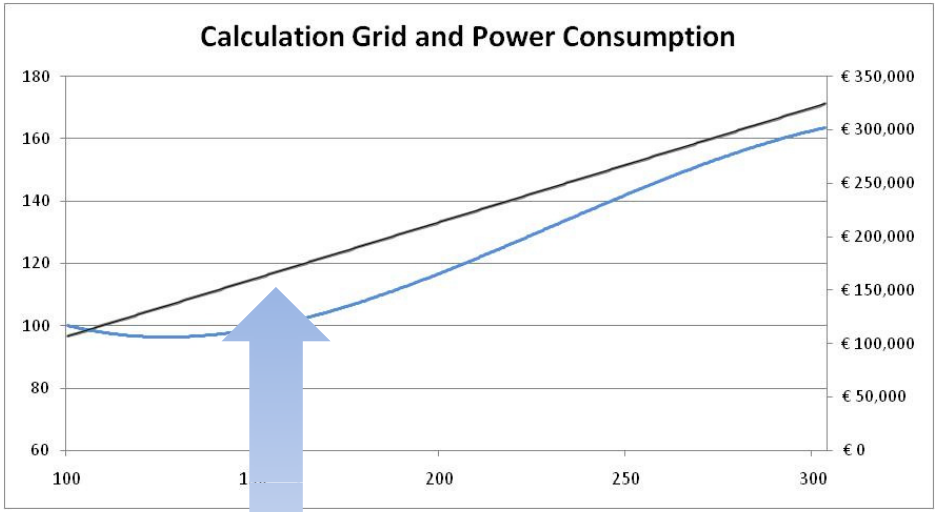
Intuitive compute model, but ...

- Consider calculation time vs. data manipulation and distribution
- Distribute data sources to eliminate input bottlenecks
- Consolidation of calculation results might serialise parallel problems
- Software development lifecycle requires adaptation – development environment to deployment environment scalability needs to be proven

Changes in business problems change the computing profile

Computational Challenge

- Explosive growth in compute farms results in space and energy demand
- Requirements hit *physical* constraints in data-centre capacity
- Data-centre costs are real and need to be part of business decision



Costs in € per year in power consumption

(700 Watt Consumption with 1x Cooling Factor at € 8.7 per KW baseload costs

Focus on:

- Increased utilisation of hardware estate
- Utilisation of idle compute cycles – "Scavenging"

Computational Challenge

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Graphics Chips ("GPU")

- Highly optimised for numerical processing. Aims for 20-fold increase in compute speed
- Suitable for desktop applications (trading desks – live risk calculation) as well as grid farm
- Benefit - commoditised hardware. Programmable in syntax close to standard "C "programming language
- Market Leaders: NVIDIA, ATI (owned by AMD).

FPGA – "Field Programmable Gate Array"

- Logic implemented very close to hardware (but not custom hardware)
- Implementation language comparable to assembler level development
- Market Leaders: XILINX, Synopsys

- GPUs are promising for specialist applications
- Increased development cost/development time
- Increased dependency on specific hardware

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The Data Challenge – Data Complexity and Volume

Data Complexity and Volume

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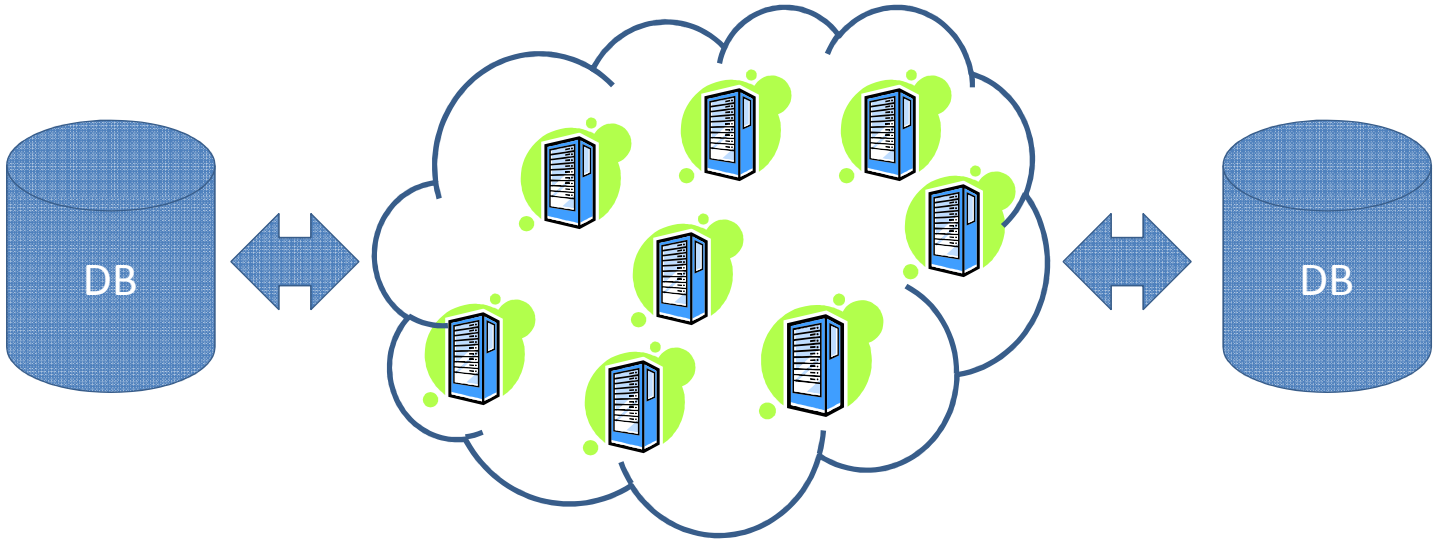
- Data Volume – constraint for growth in compute capacity
- Data management to support compute performance and data accessibility



Naïve database architecture creates bottlenecks for calculation grids

Data Complexity and Volume

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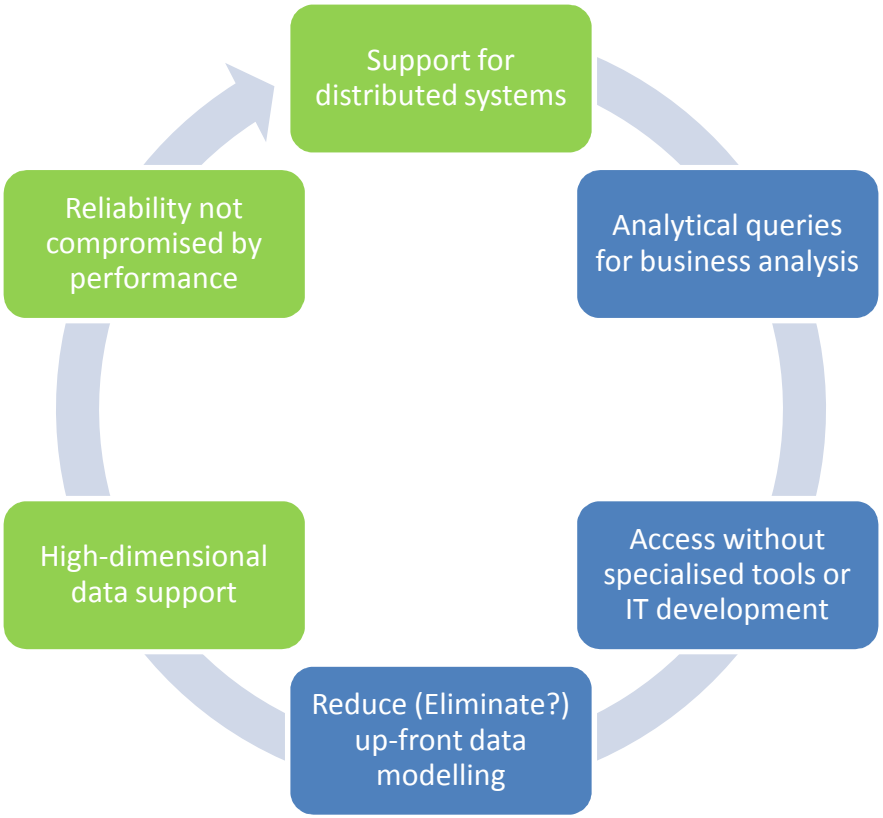
- Data Management requirements – **Technical** and **Business**



Data Complexity and Volume

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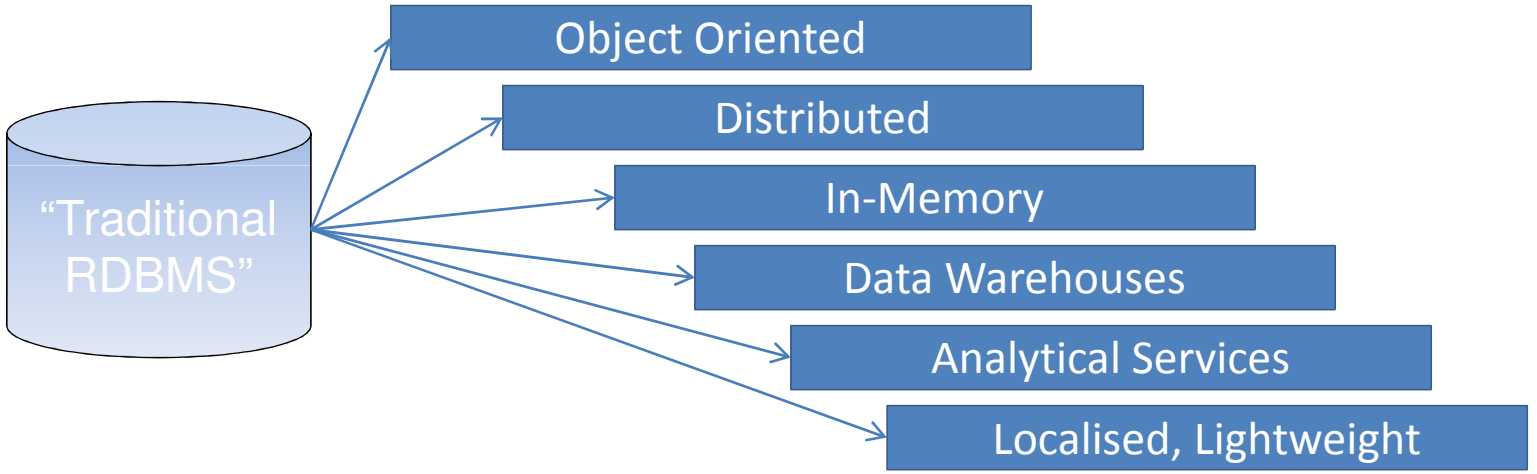
- Database technology no longer “one size fits all”
- Technology choice dependent on business architecture
- Technology choice will change with business requirements



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System Design for Change
Stressing Systems and Models
Operational Resilience

Arthur Rabatin, Barclays Capital – May 2010

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Design for Change: Stable Systems ≠ Static Systems

Checklist ....

- Iterative approach
- It's OK to make mistakes (and to change your mind)
- The simplest solution for a problem? If not, why not?

Architecture and Business Logic

- Business logic de-duplication
- System "responsibilities" catalogue

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Stress events in business increase technology impact

Stressing System performance

- Volume/Capacity Limits
- Inter-dependencies – Impact of change in timing of processing

Stressing Models

- Simulate stressed market data
- Simulate business events to extreme extent (e.g. Defaults)

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Business Continuity (BC)/ Disaster Recovery (DR)

Not only the 'worst case scenario'

- Business impact of technology outage
- Test for loss of key hardware infrastructure. Process in place?

Realise benefits of creating resilient architecture

- Leverage resilient nature of distributed systems
- Scavenging of idle compute resources in DR environments
- Recognise business stability benefit of BC management

A common driver ...

http://www.basel.ch/tourismus.htm