

*Delivering financial grid solutions on  
a compute utility service*

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The flexibility of a spreadsheet with the power of an enterprise system...

# Overview

- The problem – Structured Credit
- The technology
  - Excel
  - Web Services
  - JINI
- Implementation
  - Sun Grid
  - Case Study

# Structured Credit

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# What are Credit Products?

- Corporate Bonds
  - Lending a company money
  - Coupon depends on the credit worthiness of the company
- Credit Default Swap (CDS)
  - Buy or Sell protection on a company
  - No money is actually lent to the company
  - Form of insurance

# What about CDOs?

- Like Bonds and CDS but...
  - Contain a portfolio of companies
  - Payout dependent on some loss parameters
    - Number to default
    - Percentage of losses
    - Range of loss (e.g. 3%-6%)
  - Very hard to price!

# Pricing Credit Derivatives

- Build probability distribution of default
  - Bond prices
  - CDS prices
  - Interest rates
- Predict future cash flows to get a price
  - Easy for a single company but...

# Pricing CDOs

- How do I build a probability distribution for a large number of companies?
  - Numerical integration over all of the companies' probability distributions
  - Simulation over all the possible outcomes
- Very CPU intensive

# Technology

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# Excel

- You'll never take the spreadsheet away from the trader...
  - Flexible
  - No programmer required
- But...
  - Not scalable
  - Error prone

# Web Services

- The power of XML
  - Easy integration with Excel
  - Open up server side power
- But...
  - How do you make it truly scalable?

# JINI and JavaSpaces

- The perfect Grid infrastructure
  - *Service discovery*: resources can join or leave transparently
  - *State persistence*: data and calculations can be shared amongst users
  - *Transactional behaviour*: node failure is handled transparently
  - *Open source*: different vendors' implementations can be used without code changes

# Solution

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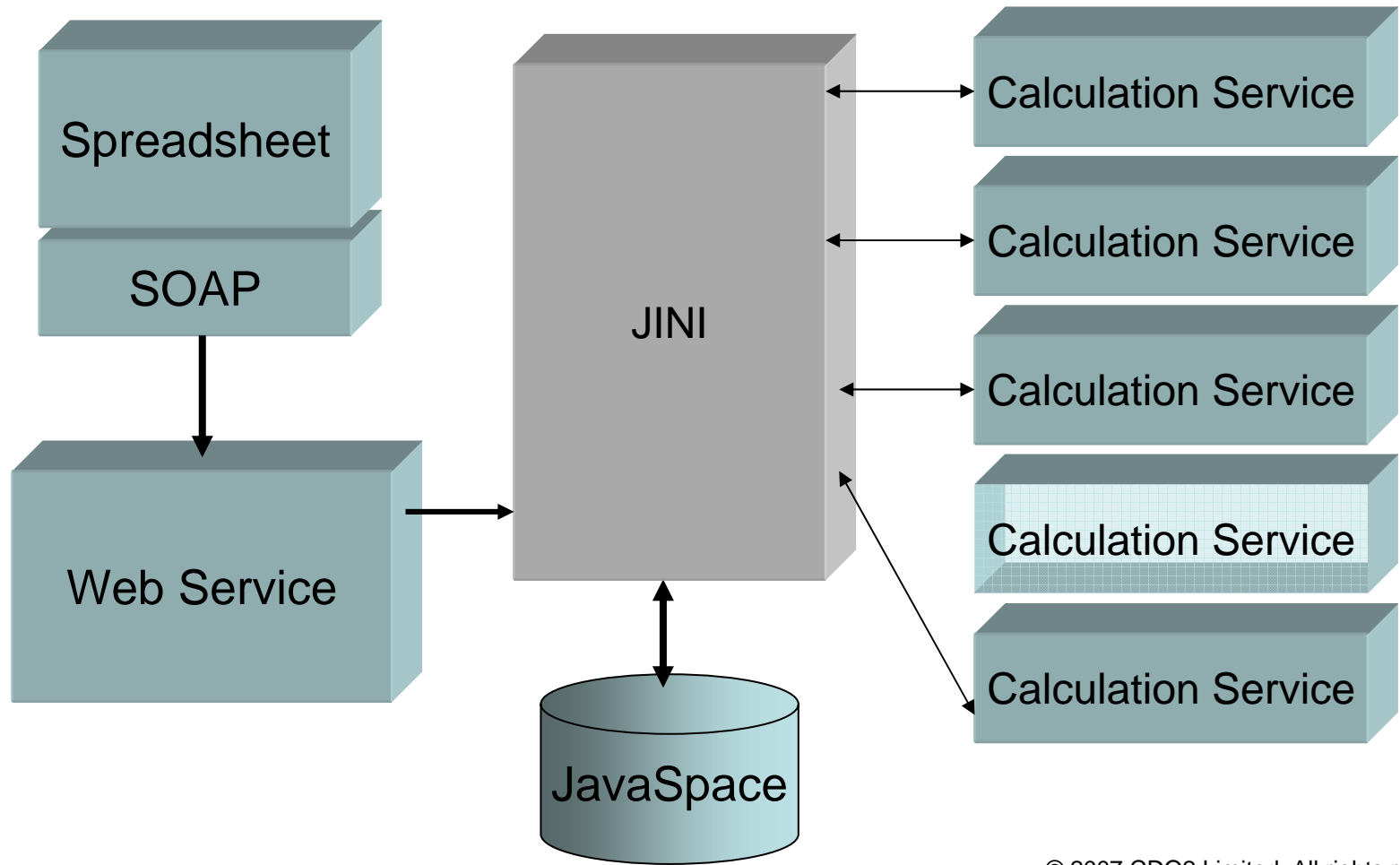
# Putting the pieces together

- Excel
  - SOAP calls implemented as Excel functions
- Web Services
  - Proxy for JINI requests
- JINI
  - Calculations performed across the network
  - Market data and results shared seamlessly

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# CDOSheet Architecture



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# Technology Choices

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# Spreadsheet

- Microsoft Excel
  - Universally accepted
  - Ready installed client base
  - Web Services support via SOAP

# Web Services

- Tomcat
  - Widely adopted
  - Pure Java
- AXIS
  - Generates WSDL from Java code
  - Easy integration with JINI

# JINI and JavaSpaces

- Sun JSK
  - Core JINI Services
  - Lookup and discovery
  - Transaction Management
- Blitz
  - Scalable JavaSpace implementation
  - Open source licensing
  - Commercial support available

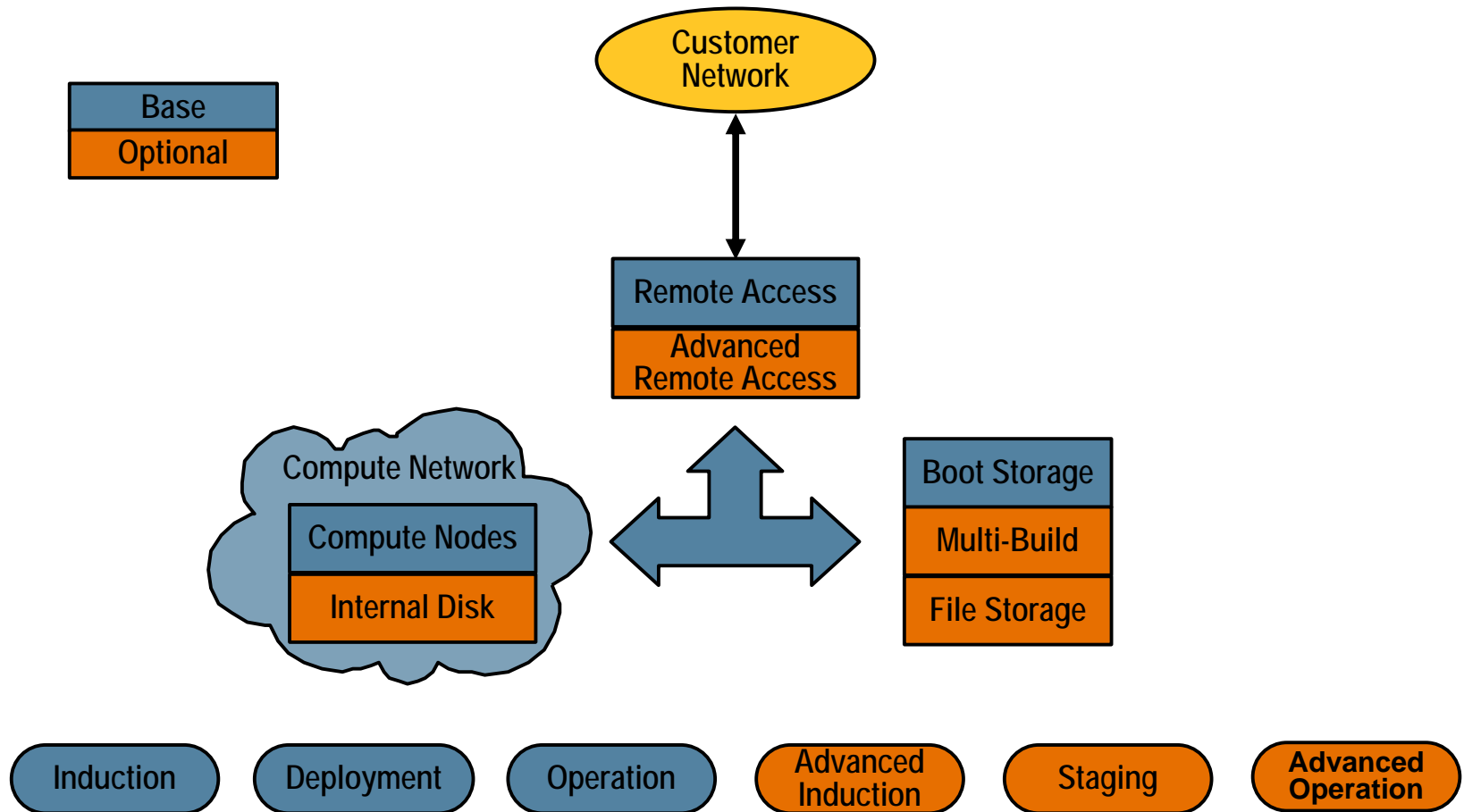
# Compute infrastructure

- Sun Grid Compute Utility
  - Predictable pricing
  - Scalable business model
  - Resilient infrastructure
  - Flexible deployment model
  - Enterprise class support

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# Sun Grid Commercial Compute Utility



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# Case Study

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# Sachsen LB Europe

- Dublin based subsidiary of East German Landesbank
- Manages €1bn plus CDO portfolio
- Desktop IT infrastructure
- Needed independent and reliable pricing and risk

# Sachsen Case Study

- Set up trial subscription to CDOSheet and market data to evaluate system
- Initial production deployment with 10 CPUs per hour
- Upgraded to 100 CPUs per hour as business grew and demand for risk analysis increased

# System topology



REUTERS 

markit



 Sachsen LB Europe plc



 Sun  
microsystems



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# Summary

- Grid computing solution delivered as Software as a Service (SaaS)
- Multi-tenanted grid environment
- Scalable business model
- Incorporates third party web services (e.g. market data)
- Secure internet deployment