Voca Payments Architecture

The Past, Present and Future

William Soo
Meeraj Kunnumpurath

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Agenda

This session covers the following topics:

- Brief company overview of Voca
- Past and Current State Architecture
- Payment Processing with the Spring Framework
- Future State Payments Architecture
- Q & A

Voca - Mission critical payment processing

- Line of Business: Payments Services
- Designs, Builds, Manages and delivers Mission Critical Payment Solutions & Services
- Owned by the major UK banks and building societies
- Part of the UK Critical National Infrastructure
- Processes all Direct Debits, Direct Credits and Standing Orders in the UK

100,000 Users connect to the Voca service, including all of the FTSE 100

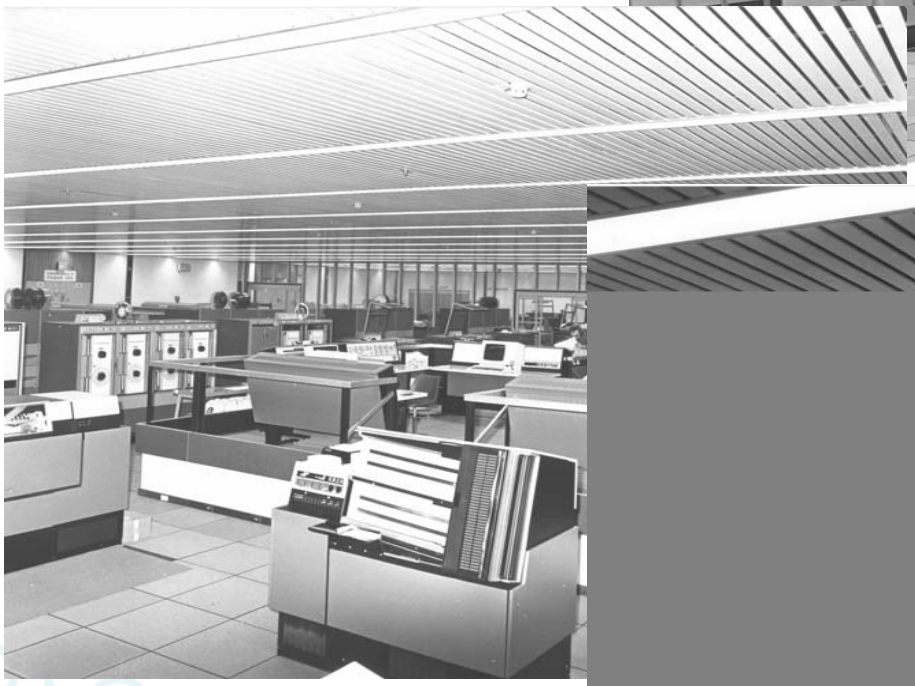
UK Market Penetration

- 90% of UK salaries paid via Direct Credit
- 70% of Household bills paid via Direct Debit

Volumes

- 5.5 billion transactions processed in 2006
- Current peak day record 80+ million
- 2006 saw the completion of Voca's infrastructure £100m Technology Renewal Programme

The Past



High Volume Processing – Key Design Principles

- Minimize movement of data
- Task Parallelization
- Physically partition data
- Optimized reads and writes of volatile data
- Minimize Contention
- Asynchronous Decoupling
- Complex Business Logic performed by Java
- Caching frequency accessed data

Payment Engine – Usage of Spring and Benefits

- Inversion Of Control (IoC)
  - Dependency Injection
  - JDBC Abstraction
  - ORM Abstraction
  - Transaction Abstraction

- Promote Best Practice
  - Modularity
  - Interface Based Interaction
  - Loose Coupling
  - Separation of concerns

- Testability
- Productivity

Overall - Increases development productivity (est. 30%) - reducing the time to market

Technology - other usage and Benefits

Hibernate

- Transparent Persistence
- Emphasis on Domain modelling
- Speed of Development
- Transitive Persistence
- Second Level Cache

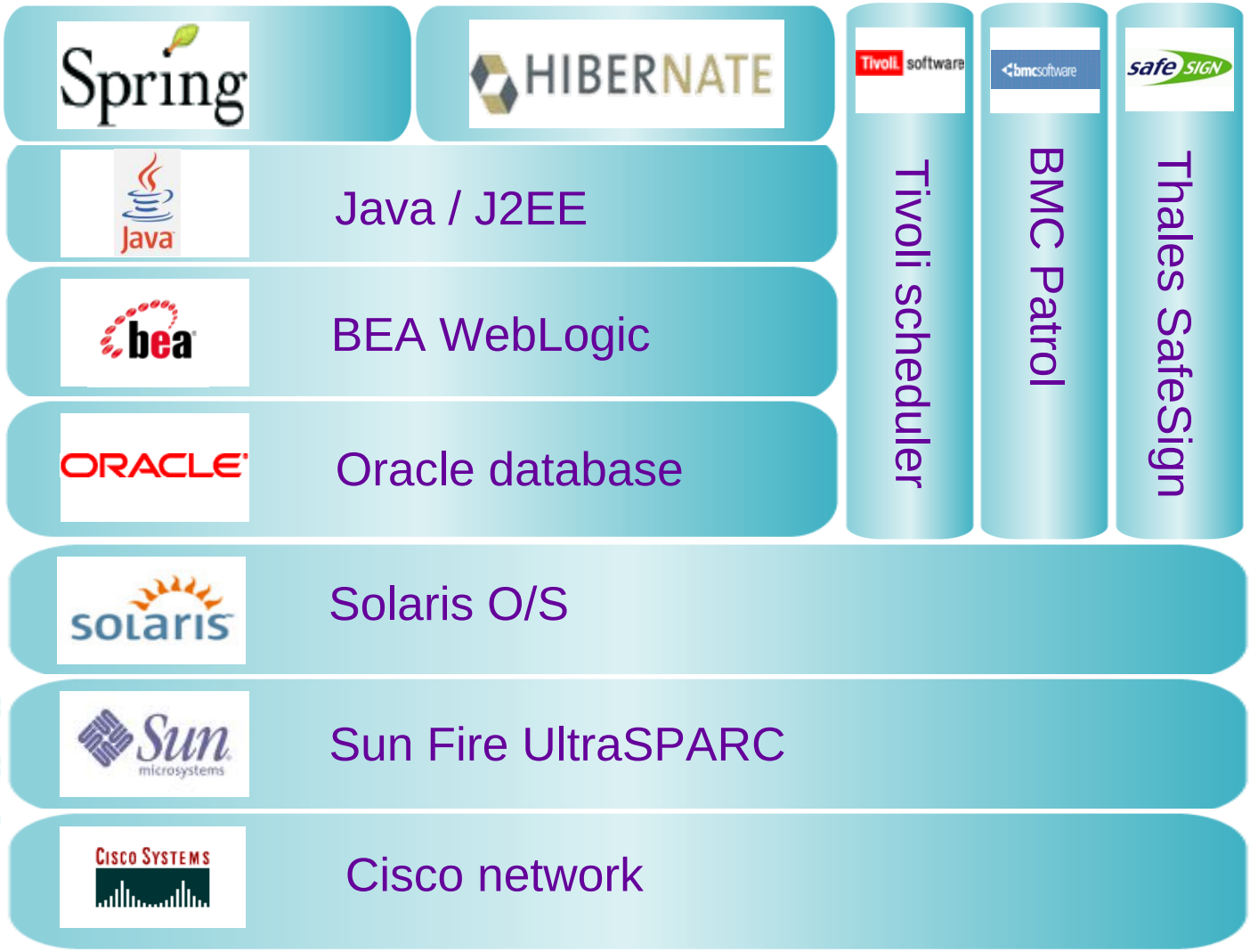
Oracle 10g RAC

- RAC – availability & Load Balancing
- Data Partitioning
- Advanced Queuing
- Bulk Operations

BEA Weblogic

- Enterprise Class Container
- Transaction Manager
- Connection Pools
- Monitoring Management
- Work Management

The current technology stack



Current Day

In July 2006, the Payment Engine went into the LIVE production environment.

The Current Peak day processing record stands at “80.3 million” transactions

The Future State Payment Architecture

SEPA – The European Business challenge

The (SEPA) initiative involves the creation of a EUROZONE in which all electronic payments are considered domestic (where there is no difference between national and international payments)

The project aims is to :

- improve the efficiency of international payments
- develop common financial instruments
- standards procedures
- and infrastructure to enable economies of scale.

SEPA consists of:

- The single currency
- New set of Euro payment instruments – SDD, SCT, Card payments
- New Standard message formats (ISO20022)
- Standard business practices / rules
- A harmonised legal Framework

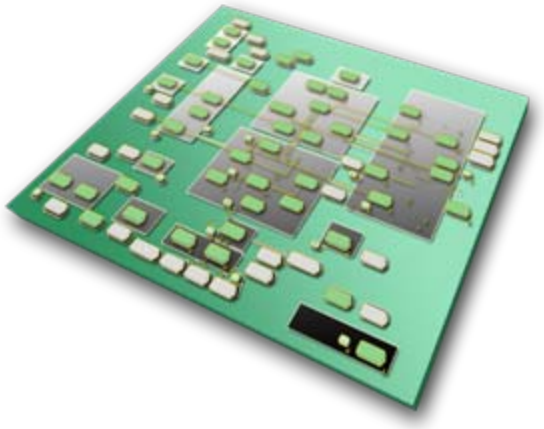
Consumer Benefits:

- Cheaper, more efficient and faster payments transfer when moving Euro within the Eurozone

SEPA challenges on the banks' IT Landscape ?

Cost pressure forces banks to...

- Consolidate the IT Landscape
- Establish a scalable platform
- Phase out old in-house developed legacy systems



Re-evaluate IT landscape in payment operations

- Re-engineer and create new platform
- In-source and establish internal shared-services
- Offshore labour intensive processes
- Outsource operations

Short term investment decision needed

- Invest in legacy systems to make them fit for SEPA
- Invest in new infrastructure (buy or build)

Who's involved

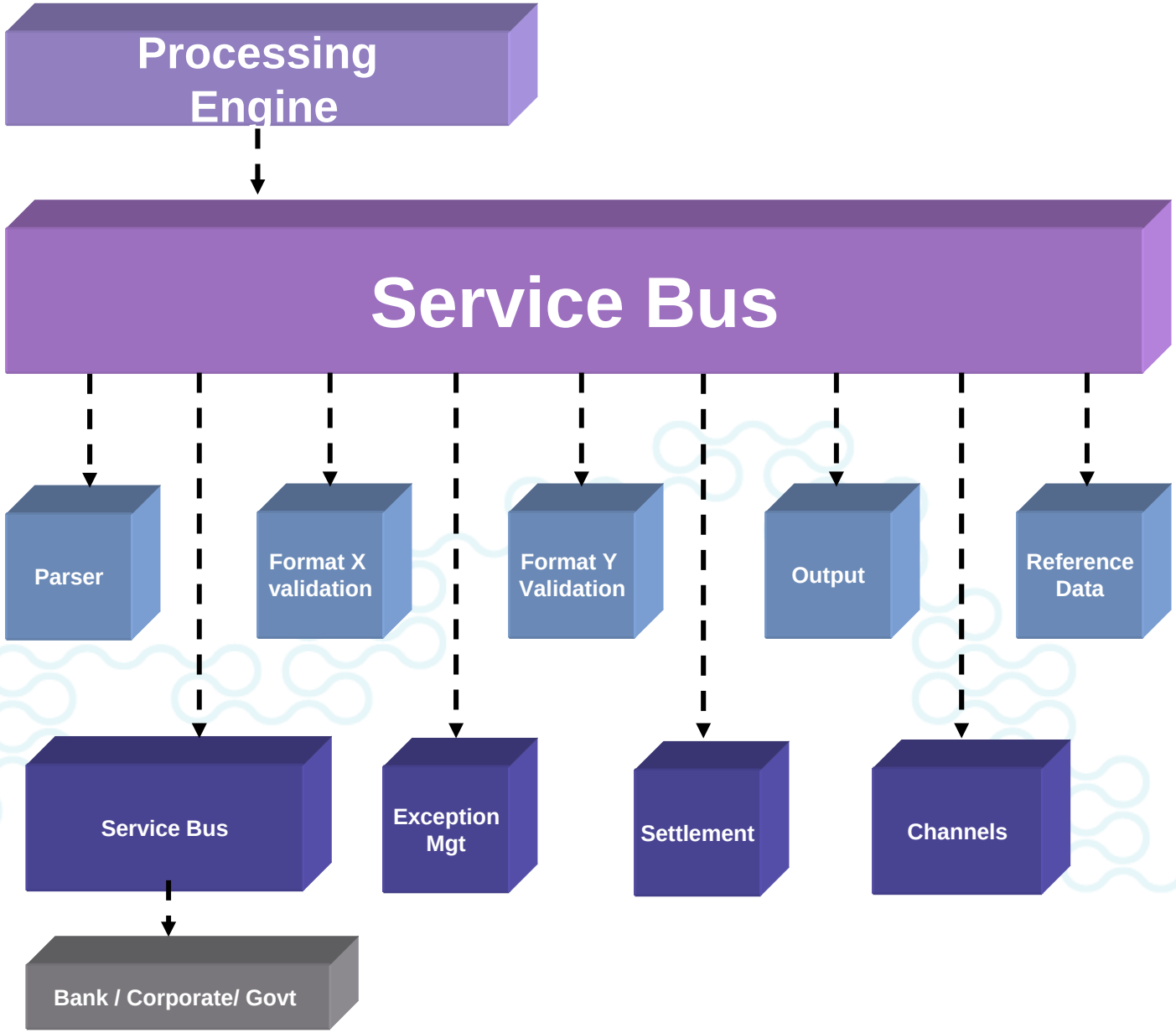
- Championed by the European Commission (EC) and the European Central Bank (ECB)

Future state SEPA Payments Architecture

Our Future State Payments architecture is based on:

- Service and Component re-use from the current UK Payments Architecture
- Integration with COTS – where appropriate
- Usage of appropriate Open Source Solutions – where makes sense
- Emphasis on Integration capabilities with Customers Back Office Systems

Voca SEPA Payments Architecture



Next Generation Payment Architecture – SW Stack

- Spring 2.0
  - JPA support
  - AspectJ Integration for Domain Driven Design
  - Configuration Extensions
  - Java 5.0 Support

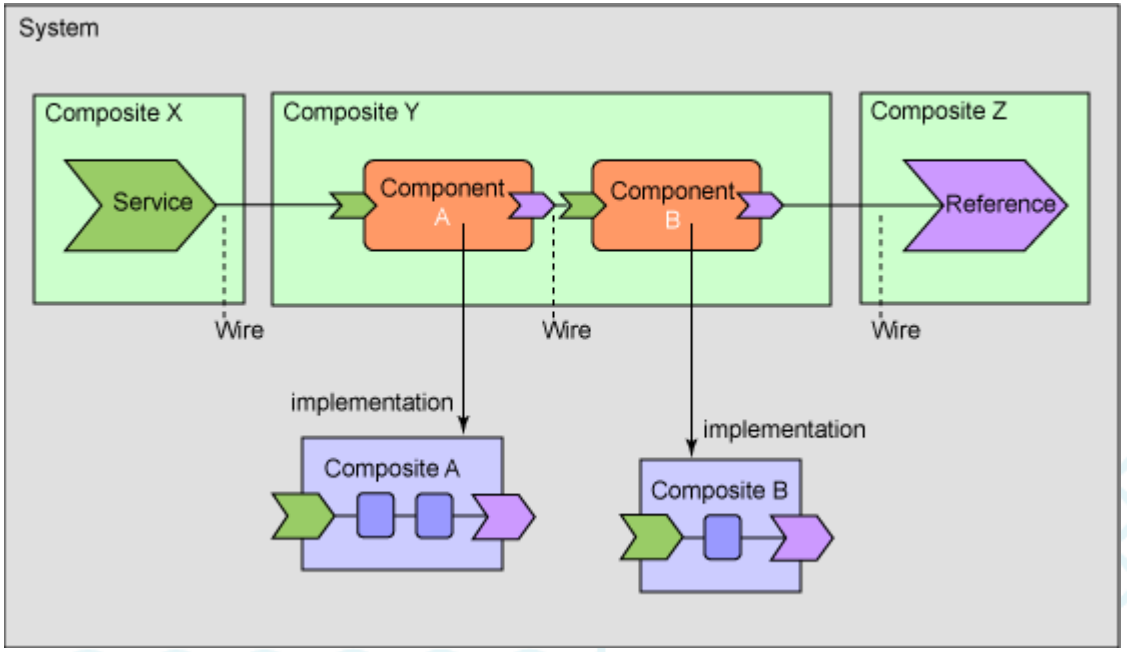
- Mule 1.4 / 2.0
  - Service Enablement
  - Application Integration
  - Message Orchestration
  - Spring Integration
  - OSGi Support

- Java 5 / JEE 5.0
- JPA / Hibernate 3.2

- JSF → SEAM
  - Moving from Struts
  - Enriches component orientated UI development
  - Removes a lot of Configuration bloat
  - Good integration with JPA

Technologies to watch for….

- SCA (Service Component Architecture) – Apache Tuscany



- SOA becoming a realistic proposition to Enterprise developers
- Standards based assembly and client & interface model
- SCA Concepts already in Mule 1.4, such as:
  - Contract based nested router
  - Conversational services

Industry Recognition

FINANCIAL SERVICES

Voca completes overhaul of UK payments systems

Cliff Saran
cliff.saran@rbi.co.uk

KEY POINTS

- Replacement for Bacs payments engine goes live
- Voca Payments Engine is final stage in £100m, four-year project
- System processes 90% of the UK's salary payments
- Planning and close collaboration are key to project's success

PROJECT AT A GLANCE

October 2002 Bacstel-IP goes live on time and under budget

2003-2005 Voca supports banking industry's migration to Bacstel-IP

November 2004 ToDDaS04 goes live to support automated transfer of direct debits and standing orders

May 2005 Reference data goes live, replacing old distributed reference data system

Autumn 2005 Parallel running of Voca Payments Engine with legacy system

July 2006 Voca Payments Engine goes live.

Clearing house Voca has gone live with its replacement for the Bacs payment engine, successfully completing a four-year IT change programme across the UK banking industry.

The £100m project began in 2002 with the roll-out of the Bacstel-IP secure online payment service. It was completed last week when Voca switched from its legacy systems to the Voca Payments Engine, which handles automated banking transactions.

Key to the project's success was planning and close collaboration with member banks and suppliers to ensure the new system, which processes 90% of salaries in the UK, was introd

Nick M of IT at Vo to ensure by the ban insisted t forward a for the pr

Voca c the complexity of the project and its importance to the national infrastructure, it would develop the core Java code in-house. Ancillary components were outsourced to Voca's in-house r to India to help velopers resolve guities.

e2 and Rational ethodologies in ement and software processes. Mas- "We had to build a level of quality in the development process which was externally reviewed to be in line with Safety Integrity Level 3," a standard used in the development of safety-critical systems such as railway signalling.

Masterson-Jones also separated the testing team from the development team; each was assigned its own programme manager, making code development and code delivery independent processes.

The Voca Payments Engine runs on a cluster of Sun Fire 25000 Ultrasparc servers using an Oracle 10g database and the BEA Weblogic 8.1 application server.

ComputerWeekly
Be in IT to get IT

computing

computing.co.uk/infrastructure

Voca's IT overhaul pays out

System upgrade allows 100 million payment transactions per day

LARA WILLIAMS

UK payment firm Voca has completed a five-year £100m replacement of its IT infrastructure to meet Single Euro Payments Area (SEPA) requirements and allow for same-day payments.

Voca processes 90 per cent of the country's salaries, 70 per cent of household bill payments and the majority of state benefits.

The new infrastructure will allow the organisation to dispense with the existing three-day clearing period in the UK and process payments

Voca IT son-Jones will be able cent annu payments pates will h tions a day

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ment woes remain uting.co.uk/2151199

Voca completes five year systems overhaul

Voca has replaced the core system underpinning the UK's £3 trillion automated payments business with the Voca Payments Engine. The completion of the project marks the final step in a five-year programme to renew Voca's entire payments infrastructure, which consisted of over 40 projects, including the development of Bacstel-IP.

The system was built by Voca on behalf of BACS Payment Schemes and its 13 member banks. Its aims are to handle the 12% per year increase in able pay- ider uire- hich irect

credits and standing orders, was completed on schedule after five months of development.

Marion King, chief executive of Voca, said: "The completion of the Voca Payments Engine was a monumental team effort involving players from across the UK banking community. It was done while continuing to process the country's payments. You could say that it was like re-wiring a house with the lights on. It the UK's automated paym while, at the same time, Voca with the capability to a more integrated Europea environment."

The engine is flexible in handling cross-border, multi-currency payments which is needed in the changing payments environment in Europe. bt

banking technology

Voca creates Europe's most advanced payments engine

tmi treasury management international

The core system at the heart of the UK's 5.5 billion, £3 trillion automated payments has been completely replaced. The new Voca Payments Engine, capable of processing 100 million automated payments in under three hours, was built by Voca, the provider of payments services, on behalf of BACS Payment Schemes Limit banks. It will handle the growth in UK electronic transactions, enable banks and Voca to deliver new payments services and support the wider industry as it migrates to the Single Euro Payments Area (SEPA).

VOCA