An Internet of Services - Visions
PESOS 2012 Keynote

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- 14 Years SOA@Credit Suisse - Experiences
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  - Strategic Challenges and Next Steps for (Service) Development
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Introduction
Credit Suisse Group
Credit Suisse Group today – key facts

- **Global bank** headquartered in Zurich, serving clients in private banking, investment banking and asset management.

- **Registered shares** of Credit Suisse Group AG (CSGN) are listed in Switzerland (SIX) and as American Depositary Shares (CS) in New York (NYSE).

- Total number of **employees***: ~50,700.

- The Group’s **long-term ratings*** are: Moody’s Aa2, Standard & Poor’s A, Fitch Ratings AA-.

* as of November 2011
A Global Network to Serve Our Different Business Needs

About 17,000 specialists are ready to serve our different business needs around the world*

* as of March 2011
IT Division Facts & Figures*

Financials / Human Capital Portfolio

- IT budget is over CHF 3.75 billion, of which
  - approx. 59% Run-the-Bank (RtB)
  - approx. 41% Change-the-Bank (CtB)
- 17,000 internal & external Employees
- One central IT Division with people in 64 different legal entities globally

Other Key Figures

- 67,100 supported users in 550 locations
- 4 main hub Production-DR pairs of data centers consuming 14 MW** of power (approx. 25,000 US homes)
- Hardware
  - 95,000 workstations / laptops
  - 25,000 physical servers with more than 33,000 terabytes of storage
  - 8 host / mainframe CPUs with 73,000 MIPS*** provided
- Software
  - 6,000 applications
- Email
  - 70,000 email accounts

* as of April 2011
** MW = Mega Watt
*** MIPS = Million Instructions per Second
14 Years SOA@Credit Suisse Experiences
Credit Suisse does SOA since 1998

Credit Suisse Information Bus
- since 1998
- 1000 services
- Seen as benchmark for the industry

PB Global SOA
- since 2005
- several countries
- > 100 services
- various back-ends
- Manage diversity

DiMA: Disentangling the Mainframe Apps
- 2005 until today
- SOA within the mainframe
- Agility for the mainframe

Enterprise SOA
- since 2008
- Integrate cross division

"Credit Suisse succeeded in building a highly business-critical integration infrastructure. The company is fully experiencing the benefits of SOA and the componentization of core business applications. However, to reach that desired state, Credit Suisse went through a lengthy and expensive endeavor that only leading-edge, technically sophisticated enterprises will be able to tackle."

Gartner Group
Main Ingredients of SOA at Credit Suisse

1. Decomposition into Components
2. Credit Suisse eXchange Bus (CSXB)
3. Central Service Repository
4. SOA Governance
1. Decomposition into Components

- IT landscape decomposed into business domains consisting of related business data and functions

- These coarse-grained components are (de)coupled through services

- Services expose a business view, i.e. they are not coupled to database designs or existing data structures
2. Credit Suisse eXchange Bus (CSXB)

- **User Group Specific Portals**
- **CSXB Portal Integration**
- **CSXB Service Integration**
  - Synchronous remote call (RPC)
  - Asynchronous store-and-forward
  - Bulk file transfer

- **OBPM: OneBank BPM Platform**
- **IFMS: Interface Management System**
- **Design Repository**

**Key Terms**
- OBPM: OneBank BPM Platform
- IFMS: Interface Management System
- Application
- Interfaces
- Domains, Divisions, Regions
Integration Styles, Infrastructures and Technologies

- CSXB
  - Logical concept
  - Multiple integration styles
  - Standard integration technologies

- Example
  - Requirement: get all customers of a relationship manager, results to be displayed on a screen
  - Integration style: synchronous request response service operation
    `searchCustomers(r : RelManager) : Customers`
  - Infrastructure and technology: Web Service exposed via Service Bus
3. Central Service Repository

- Service Catalog
- Design tool
- Governance enforcer
- Lifecycle management
- Code generator

Interface Management System (IFMS)
IFMS User Community

- **Service Designer**
  - Design new service interfaces
  - Import from other design tools (e.g. modeling tools)
  - Submit interfaces to the review process

- **Service Reviewer**
  - Review all new service interface designs

- **Service Developer**
  - Find service interfaces to call from their applications
  - Download code snippets for service invocation
  - Generate server-side skeletons when implementing services

- **Service Portfolio Manager**
  - Manage service portfolios and detect redundancies
4. SOA Governance
IT Architecture Disciplines at Credit Suisse

**Business Architecture**
The business model based on the utilization of optimal processes and organizational structures
*Which functions, processes, and organizations?*

**Application Architecture**
The application landscape is well structured and established according to common principles
*Which applications and components?*

**Technical/Platform Architecture**
Standardized application platforms based on standardized technical components
*Which IT infrastructure?*

**Data Architecture**
Standardized Data and Information lifecycles, representation and integration

**Integration Architecture**
Standardized interfaces and infrastructures for the integration of applications

**Security Architecture**
Adequate protection of processes and data, dependable traceability of business transactions

**Systems Management Architecture**
Cost efficient and dependable operation of the IT systems

**IT Architecture Governance and Processes**
Well-defined processes assure transparent decision-making, adequate communication and consistent enforcement of architecture with respect to the current situation
Integration Architecture
Main Focus Areas

- **Reduce complexity** through componentization and managed interfaces
- Promote integration through a logical **bankwide integration** bus with multiple supporting infrastructures
- Standardized portal architecture to support **cross-divisional sharing**
- Business Process Management standards **improve speed and quality of business processes**
- **Secure and flexible** B2B communication using industry standards
Quality Assurance Process

- QC1 - Integration Architecture Team
  - Is the service understandable?
  - Is the service necessary?
  - Is the service positioned correctly?

- QC2 - Cross-functional Review Team
  - Is the service and the new data types following the design principles?
  - Is the service using the correct types?

- QC3 - Tool & Process Support
  - Are all QC Obligations fulfilled?
  - Is it implemented as specified?
Experience: Use of services follows availability

- Wide use of services follows a critical mass of available services
- Today ~ 5 billion service calls a year in Switzerland
- Fully decoupled platform some years ahead
- Core banking system on mainframe completely decoupled from remainder of platform

200 services available
600 services available
800 services available
900 services available
1100 services available

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Experience: Reuse is very uneven

- Re-use of services varies based on type of service. Reference Data Services have the highest re-use.
- About half of the services are reused
- Average re-use degree is 4 – 4 different client applications using a service
Visions: Strategic Challenges and Next Steps for (Service) Development
# External Trends Review

## Mid- and long-term (5-10 years) relevant topics for bank IT units*

<table>
<thead>
<tr>
<th>5-year perspective</th>
<th>10-year perspective</th>
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<tbody>
<tr>
<td>Mastering of &quot;technical debt&quot;</td>
<td>The future IT infrastructure – the cloud</td>
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<tr>
<td>▪ Increased software quality: (re-)establish requirements specs, (re-)design specs, code, test cases and test data</td>
<td>▪ Fully automated data centers with completely standardized HW components</td>
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<td>▪ Data (re-)design and master data management</td>
<td>▪ SW has to fulfill strict quality criteria:</td>
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<td>▪ limited size and complexity</td>
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<td>▪ well-defined runtime features (e.g. response time)</td>
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<td>Industrialization of Solution Delivery</td>
<td>▪ 100% tested and error-free</td>
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<td>▪ Flexibility of development procedures (e.g. adaptation to DWH, COTS integration and reengineering)</td>
<td>▪ standardized interfaces</td>
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<td>▪ Tools for development, test efficiency &amp; quality assurance</td>
<td>▪ decoupled architecture on all classical layers (UI, business logic, data)</td>
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<td>New types of business requirements</td>
<td>▪ SW will be generated from sophisticated models to be independent from cloud providers</td>
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<td>▪ Security and risk tolerance in global distributed environments</td>
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<td>▪ Business Intelligence for big data and analytics</td>
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External Trends Review
Impact on solution delivery

**Business environment changes**
- The leader in competition will be the one with simpler, smarter and more reliable solutions for
  - bank customers (e.g. portfolio advisory)
  - business users (e.g. business intelligence)
  - regulators (e.g. global reporting)

**Technology changes**
- Cloud computing as the next technical revolution is characterized by
  - a fully automated IT production
  - SOA services with model-generated code
  - distributed data with risk-based security

**Technical debt**
- The legacy of immature development sums up to ~270 m$/100 mLOC$[4]$ for
  - missing requirements specifications
  - missing design specifications
  - bad code quality
  - missing test cases and test data

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$mLOC = \text{Millions lines of code}; \sim 100 \text{ mLOC is the Swiss Banking IT Platforms code base}$

**Challenges for solution delivery**
- Improved business/IT alignment
  - to understand customer needs and business efficiency (e.g. UI)
  - for an agile adaptation to new requirements
  - to reduce the in-house value chain

- Methods, tools and skills for
  - implementing SOA services
  - model-driven development and model-generated components
  - strict SW quality assurance
  - build-in security and dynamic runtime behavior
  - data design and master data management
  - software and documentation analysis
  - reengineering
Next steps for our Internet of Services

- Globalization of SOA within Credit Suisse
  - Standardization of (reference) data structures
  - Global support organizations for SOA infrastructure

- Migration of 2'600 CORBA service operations to Web Services

- Consolidation of data flows between front and back offices

- Adoption (and improvement) of financial industry standards, e.g. SWIFT

- Global management of the ever-growing service portfolio
Visions: Research Topics
Where we reach the limits – areas for research I

- Security remains a challenge
  - Secure passing of the original initiator to all services involved (in the absence of sessions)
  - Second line of defense: Application level firewalls analyzing service traffic, distributed logging of service invocation, service monitoring for unexpected use
  - Fine-grained access control

- Managing large service networks
  - Version/release management with 1000s of services and 100000s of clients, semantic compatibility
  - System Management, service-level control, fault-tolerant designs, capacity management, service replication
  - Testing of complex component networks
  - Accounting of service use
  - Development governance, balancing reuse with demand-driven development
  - Cross platform interoperability
Where we reach the limits – areas for research II

- Semantic alignment
  - Keeping large service landscapes semantically aligned, federation
  - Semantics in dynamic service discovery
  - Systematically linking integration architecture to business architecture
    (information model, process model, function model)
  - Blending external standards with internal extensions

- High volume, low latency implementations
  - Market data, 100000s of messages per second, distributed to many clients,
    publish subscribe pattern, sub-ms latency expectation
  - Special HW, FPGA
  - Special Network-Devices
  - Simplified protocols

- Cloud services
  - Service markets
  - Domain-based interface standardization
  - Security
  - Pricing
Q&A
Literature/Contact
Literature


http://www.accenture.com/de-de/Pages/insight-technologie-vision-2011.aspx

http://www.ch.capgemini.com/insights/publikationen/it-trends-2011/

http://blog.castsoftware.com/gartner-cast-whitepaper-how-to-monetize-application-technical-debt/

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