It’s not About Technology Anymore (Including the Case for Modularity)

Eric Newcomer
Chief Architect, Investment Banking Division, Credit Suisse
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**: 49,200.

- The Group’s **long-term ratings** are: Moody’s Aa2, Standard & Poor’s A, Fitch Ratings AA–.
Credit Suisse vs. peers: March 31, 2010

### Market Capitalization, USD bn

<table>
<thead>
<tr>
<th>Bank</th>
<th>Market Capitalization, USD bn</th>
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<tbody>
<tr>
<td>Bank of America</td>
<td>179</td>
</tr>
<tr>
<td>JPMorgan</td>
<td>178</td>
</tr>
<tr>
<td>Chase</td>
<td>116</td>
</tr>
<tr>
<td>Citigroup</td>
<td>93</td>
</tr>
<tr>
<td>Goldman</td>
<td>62</td>
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<td>Sachs</td>
<td>48</td>
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<tr>
<td>UBS</td>
<td>41</td>
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<tr>
<td><strong>Credit Suisse</strong></td>
<td><strong>61</strong></td>
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<tr>
<td>Deutsche</td>
<td>48</td>
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<td>Bank</td>
<td>41</td>
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<td>Morgan</td>
<td>41</td>
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<tr>
<td>Stanley</td>
<td>41</td>
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### Balance Sheet Assets, CHF bn

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<th>Bank</th>
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<tbody>
<tr>
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<tr>
<td>Sachs</td>
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<tr>
<td><strong>Credit Suisse</strong></td>
<td><strong>1,271</strong></td>
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<td>Morgan</td>
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<tr>
<td>Stanley</td>
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### Assets under Management, CHF bn

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<tr>
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<td>Morgan</td>
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### Employees – Number of FTEs, t

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<td><strong>33</strong></td>
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<td>Sachs</td>
<td>33</td>
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</table>

1) IFRS accounting standards
2) Citigroup does no longer disclose any information on AuM
Dynamic Business requires IT agility

- Many current business trends have direct impact on the corporate IT
  - Fragmentation of the value chain (In/Outsourcing, Aggregation)
  - Mergers and acquisitions
  - Frequent strategy changes
  - Offshoring
  - Cost reduction

- High pressure on IT to increase effectiveness and efficiency
  - Fast reaction to new requirements in business
  - Fast adaptation to varying transaction volumes
  - Acceptable fixed cost

- IT needs to be prepared for change
  - Create structures that allow for fast adaptation and/or extension
  - Ensure long-term cost-effectiveness

→ Establish a flexible enterprise architecture based on SOA
IT Complexity at Credit Suisse

Today‘s IT systems have the following characteristics:

- **Very-large-scale**: in CREDIT SUISSE more than 3000 applications with more than 100,000,000 Source Lines of Code

- **High complexity**: large number of tightly coupled, networked components

- **Aging**: parts of the system are becoming obsolete and must be replaced (obsolete technology, end-of-life applications)

- **High rate of change**: continuous flow of new business requirements which must be implemented (Several 1000 application changes per week)

- **Demanding operational quality**: systems must have high reliability, good availability, sufficient security etc.
Costs of Complexity

- Complexity increases unless something specifically is done to reduce it
- Projection is from 2010 to 2017 to produce more code total than currently exists *
- Solution to complexity is modularity (Kirk Knoernschild et al) **
- Solution to modularity is OSGi
  - Benefits of modular programming well understood for 40 years
  - Until OSGi the benefits were the responsibility of developers & architects
  - OSGi metadata and framework enforces modularity
- Modularity is a key goal of Credit Suisse’s SOA efforts

* http://users.jyu.fi/~koskinen/smcosts.htm
** http://techdistrict.kirkk.com/2010/02/17/osgi-devcon-preview/
Our most important strategic objective for IT is to enable business growth by reducing complexity.

Reducing overall complexity by eliminating fragmentation and increasing standardization.

Continuous improvement

Simplification initiatives
Continued investment in our infrastructure is a key cost management requirement. This process of "managed evolution" is needed to balance the two levers of investing in business functionality and IT efficiency.
Credit Suisse IT Architecture Areas

Business Architecture
The business model based on the utilization of optimal processes and organizational structures

Application Architecture
The application landscape is straight structured and established according to common principles

Infrastructure Architecture
Standardized application platforms based on standardized technical components

Integration Architecture
Standardized interfaces and infrastructures for the integration of applications

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
Cost reduction of more than one third
- Modal split between "change" and "run" remained constant at a high level.
- Much more functionality (CRM, reporting, products, internet banking, GUIs on almost all applications, automated trading, straight-through processing, ...)
- Much more business volume
- Substantially improved stability
- Many non-architecture related initiatives (offshoring, sourcing, project portfolio management, reorganizations, ...)
- from 2007: additional cost to support growth strategy

**Does IT Architecture Generate Value?**

- Complexity reduction
  - Data center
- Application clean-ups (accounts, MIS, trading, payments, front systems, ...)
- Various technology phaseouts (OS/2, SNA, Smalltalk)
- Application platforms (Java, DWH)
- Service architecture, interface management
- Established architecture governance
The emphasis shifts from functionality to efficiency

• In the early days everyone needed more features and functions to meet business automation requirements
• As the IT industry matures
  – We find we have the features and functions we need (for the most part)
  – In our products and infrastructures
• And we find, after the initial big push to automate, we have more applications than we really need
• No one was thinking about enterprise architectures
• And now we are stuck with complexity
• (You know the type of picture…)
Almost all of the business applications of the enterprise were not written using consistent architecture. Instead they are byproducts of the evolution of IT:

- Mainframe transactions
- C++ Client/Server Apps
- Middleware Islands
- Home Grown / Dark Matter
- Java / .NET mixture

Solution: Expose and modularize existing enterprise systems as software services

- Plug-in to business applications and process flows
- Encapsulate the unique complexities
- Extend into the services foundation of today’s modern software platforms
Example 1: PB – Credit Suisse Information Bus (CSIB)

**Facts**
- Started in 1998
- More than 1000 services built up to now
- All PB applications offer and/or consume services today

**Objectives**
- Enable Managed Evolution
- Component architecture for the Swiss Platform
- Reuse of core data&functionality (mainly) residing on the mainframe

**Technology**
- CORBA for synchronous services
- WebSphere MessageBroker / MQ for messaging
- Connect:Direct for files

**Footprint**
- About 1000 public services, 70 message publishers
- 280 million CORBA calls & 120 million messages delivered per month
Example 2: PB – Global SOA

**Facts**
- Started in 2005
- About 30 Services built up to now
- Services implemented in various countries
- Re-use the same frontend applications with different local backends

**Objectives**
- Initial driver: common global frontend application
- Basis for a common front applications target architecture (FATA)

**Technology**
- Web Services (only synchronous communication needed)

**Footprint**
- Small number of interactions today.
- Large growth coming with important new initiatives (Global Front Components based on FATA)
IB Approach: Moving from Silos to SOA

Siloed applications

Intermediate stage: Identify reusable components

Goal: Service-oriented architecture
Existing Systems Need to Evolve

- They can’t be replaced all at once
- Some systems have been in place for 30–40 years
- Architecture decomposes the problem
- Modules can be isolated and replaced separately
- Additional considerations include:
  - Standardizing the deployment platform(s)
  - Inventorying the applications
  - Adopting industry standards
- For example, Credit Suisse’s current picture
More than 3000 Applications… in the Common Domain Model

5: Communications & Collaboration

Business Partner Applications (BPA) 19 1 0 1
Enterprise Content Management (ECM) 8634 1 2
Financial Market Information (FIN) 65152 0 0
Communication and Access (CHA) 14727 0 0
Street Side Interfaces (SSI) 7740 1 1

1: Partners & Persons
2: Finance, Investment & Sales
3: Trading and Markets
4: Cash and Asset Operations
5: Communications & Collaboration
6: Accounting, Controlling and Reporting
7: Enterprise Common Services

PB Apps CoS Apps IB Apps AM Apps
Domains are high-level components coupled using services
Supporting Tool: Interface Management System (IFMS)

• Component owners need to **design** the interfaces of their components (planning and design)

• Developers need a **generator** producing source code for using the interfaces

• Service users need a **catalogue** with powerful search functions so they find the right functionality
Target state: Credit Suisse eXchange Bus (CSXB) for federated SOA
Summary

SOA Design + SOA Infrastructure = Simplicity

Software Tools, Governance & Process

Organization