IT Division Facts & Figures (July 2010)
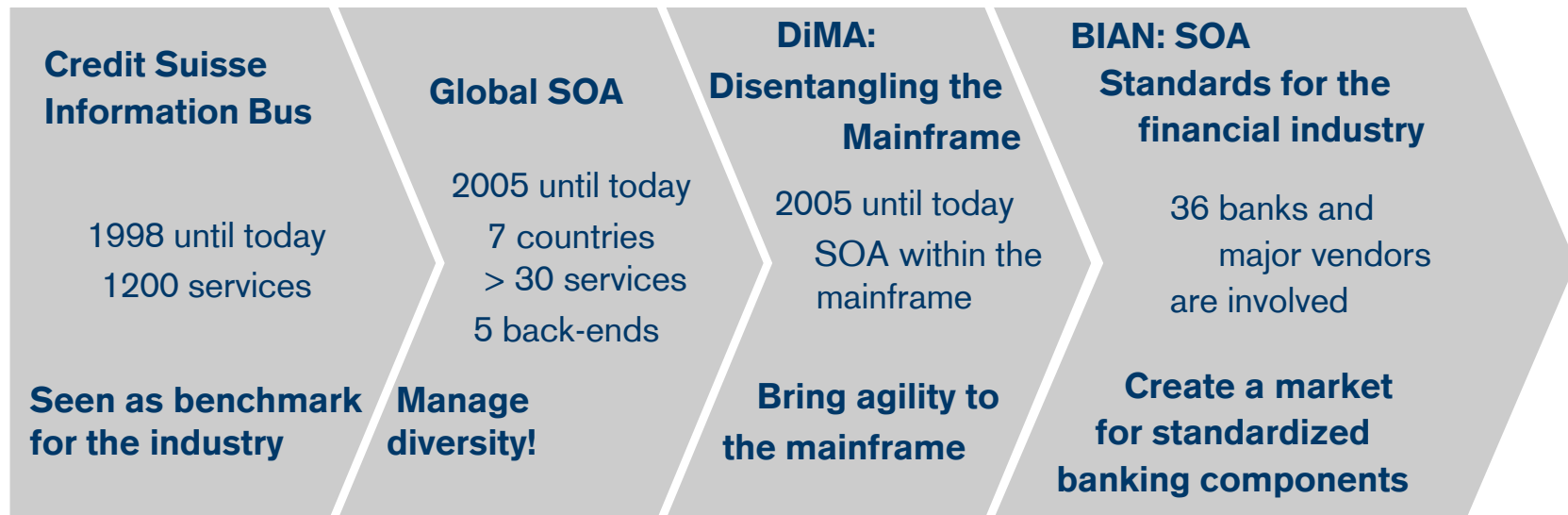
Financials / Human Capital Portfolio

- IT budget is CHF ~3 billion, whereof
  - ~55 % Run-the-Bank (RtB)
  - ~45 % Change-the-Bank (CtB)

- IT headcount is ~14'000, whereof
  - ~9'500 permanent FTE
  - ~4'500 contractor FTE
  - plus additional 3'500 out-sourced services FTE

- One central IT Division with people in 64 different legal entities globally

Other key figures

- 67'500 supported users in 550 locations

- 4 main hub Production-DR* pairs of data centers consuming 14 MW** of power (~25'000 US homes)

- Hardware
  - 93'500 workstations / laptops
  - 26'000 physical servers with more than 18'000 Terabyte storage
  - 10 host / mainframe CPUs with 61'700 MIPS*** provided,

- Software
  - 6'700 applications

* DR = Disaster Recovery,   ** MW = Mega Watt,   *** MIPS = Million Instructions per Second

CREDIT SUISSE

Authors: Claus Hagen, Carl Worms
Date: 09/17/2010 Slide 1

We do SOA since 1998

Credit Suisse Information Bus

1998 until today
1200 services

Seen as benchmark for the industry

Global SOA

2005 until today
7 countries
> 30 services
5 back-ends

Manage diversity!

DiMA: Disentangling the Mainframe

2005 until today
SOA within the mainframe

Bring agility to the mainframe

BIAN: SOA Standards for the financial industry

36 banks and major vendors are involved

Create a market for standardized banking components

"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

The Credit Suisse Information Bus (CSIB)

Facts
- Started in 1998
- More than 1200 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
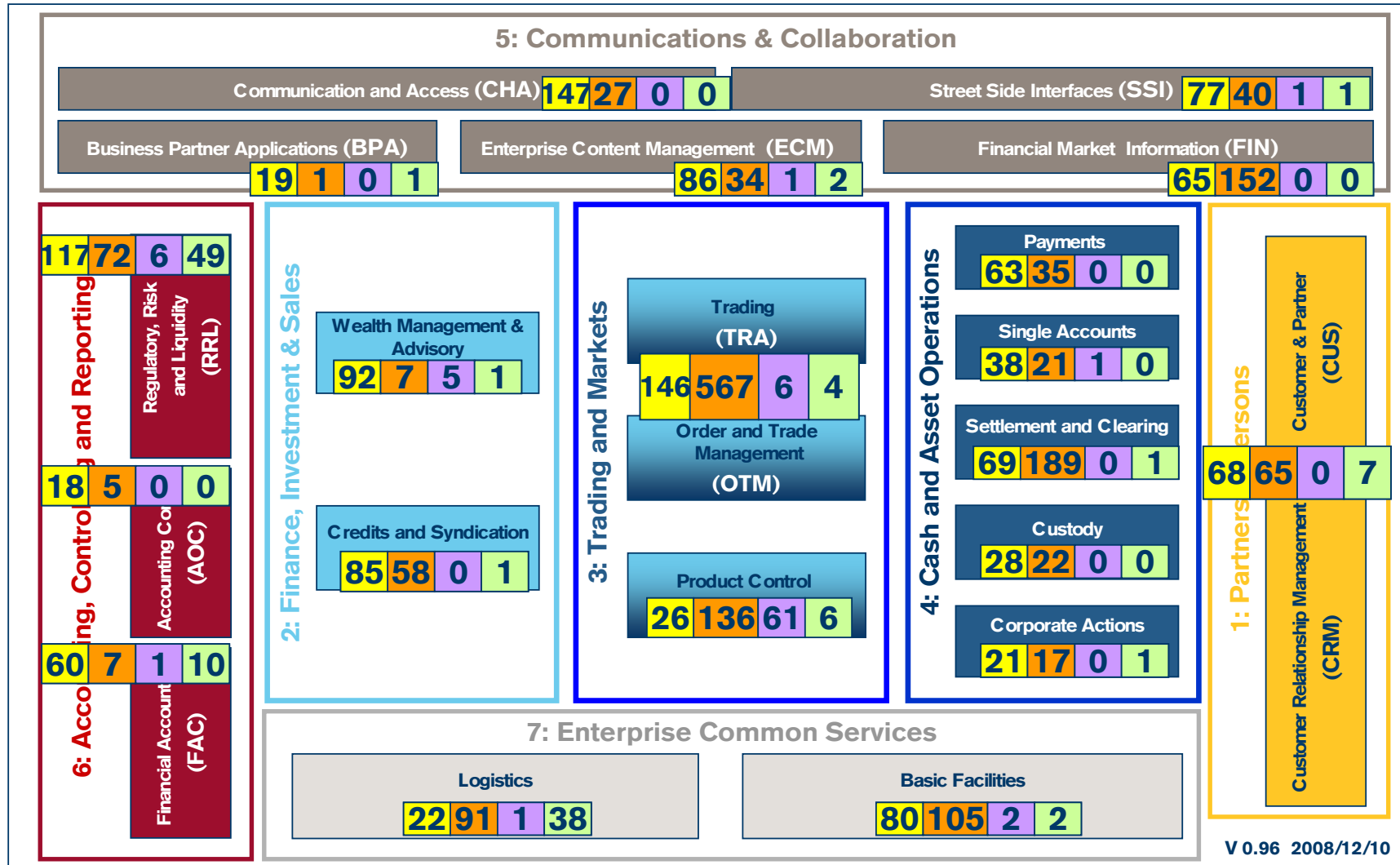
Technology
- CORBA for synchronous services
- WebSphere MessageBroker / MQ for messaging
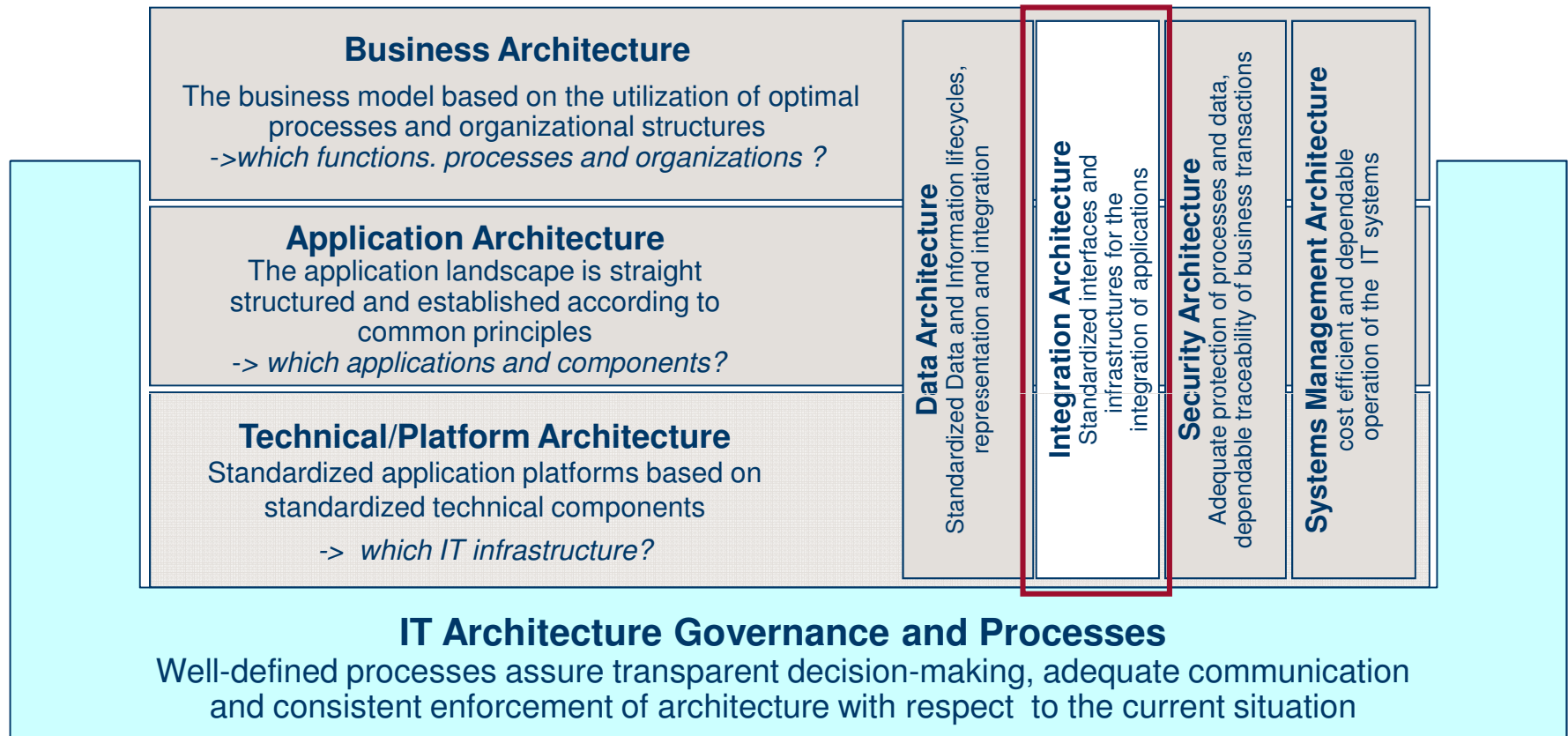- Connect: Direct for files

Footprint
- About 1000 public services, 70 message publishers
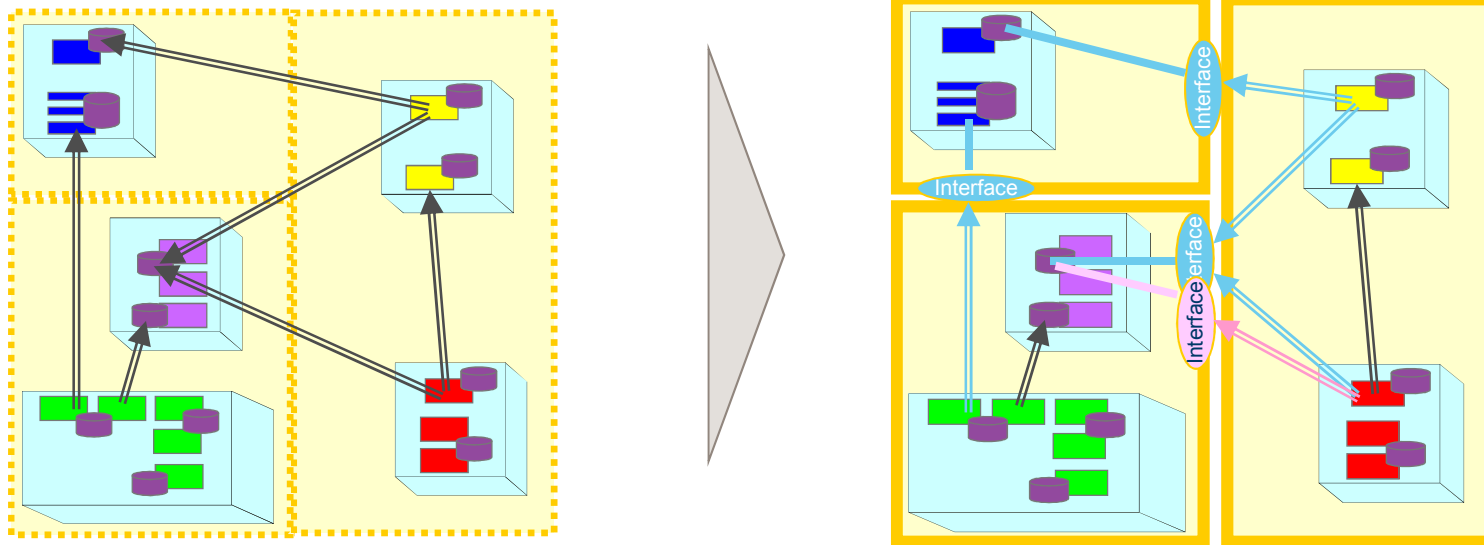- 280 Mio CORBA calls & 120 messages delivered per month

Complexity is: have ~6'700 applications

5: Communications & Collaboration

Communication and Access (CHA) **147** **27** **0** **0**

Street Side Interfaces (SSI) **77** **40** **1** **1**

Business Partner Applications (BPA) **19** **1** **0** **1**

Enterprise Content Management (ECM) **86** **34** **1** **2**

Financial Market Information (FIN) **65** **152** **0** **0**

6: Accounting, Controlling and Reporting

117 **72** **6** **49**

Regulatory, Risk and Liquidity (RRL)

18 **5** **0** **0**

Accounting Co (AOC)

60 **7** **1** **10**

Financial Account (FAC)

2: Finance, Investment & Sales

Wealth Management & Advisory **92** **7** **5** **1**

Credits and Syndication **85** **58** **0** **1**

3: Trading and Markets

Trading (TRA)

146 **567** **6** **4**

Order and Trade Management (OTM)

Product Control **26** **136** **61** **6**

4: Cash and Asset Operations

Payments **63** **35** **0** **0**

Single Accounts **38** **21** **1** **0**

Settlement and Clearing **69** **189** **0** **1**

Custody **28** **22** **0** **0**

Corporate Actions **21** **17** **0** **1**

1: Partners Persons

Customer & Partner (CUS)

68 **65** **0** **7**

Customer Relationship Management (CRM)

7: Enterprise Common Services

Logistics **22** **91** **1** **38**

Basic Facilities **80** **105** **2** **2**

V 0.96 2008/12/10

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Challenge no. 2: IT Architecture governance & structure

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 straight 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

Challenge no. 3: anticipate the future in 5 – 10 years e.g. target architecture of the CS eXchange Bus (CSXB)

User group specific portals

CS eXchange Bus (CSXB)

Component	Component	Component		Component	Component	Component
Component	Component	Component		Component	Component	Component
Component	Component	Component		Component	Component	Component
Component	Component	Component		Component	Component	Component

Divisional and RegionalComponents (Applications, Data)

Challenge no. 3: anticipate the Future in 5 – 10 years e.g. from monolithic to loosely coupled components

- Define a modular architecture with encapsulated subdomains (target architecture)

- Replace direct access via standardized interfaces: Introduction of interfaces along the borders of subdomains
  → Introduce *structural changes without including new functionality*

- Decouple the lifecycle of the subdomains by versioning of the interfaces

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Challenge no. 4: multiple infrastructures

IFMS

CS X Bus

Integration type	Synchronous Integration	Event Integration (asynchronous)	Bulk Integration (asynchronous)	Portal Integration
Infrastructure class	Service Infrastructure	Messaging Infrastructure	File Transfer Infrastructure	Portal Int. Infrastructure
Integration technology	SOAP/https CORBA RMI, IMS CLI	WMQ EMS	FTPS C:D	WSRP(*) JSR 168,286
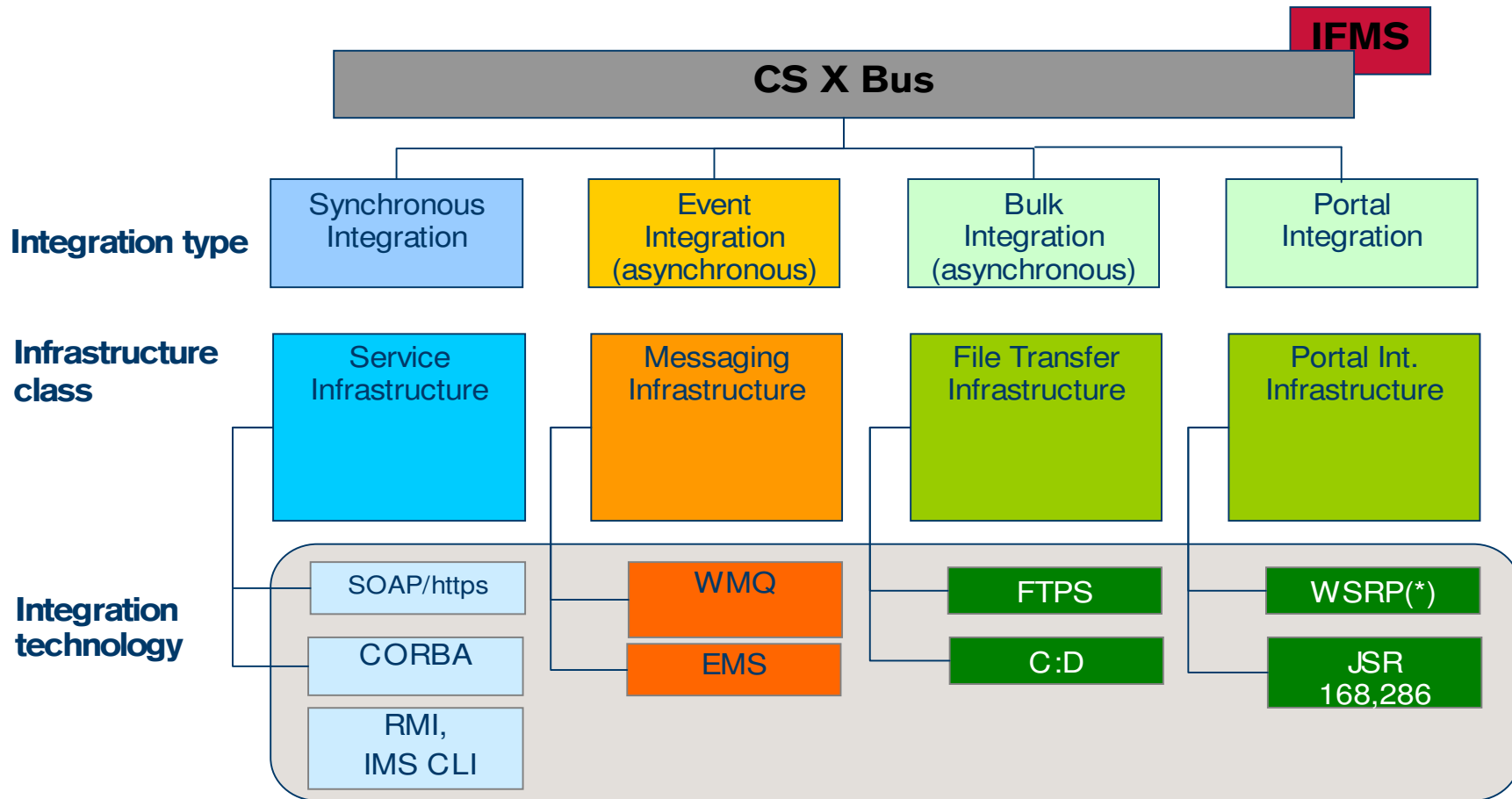
(*)WSRP subject to reconsideration as part of ongoing Portal strategy work

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Challenge no. 5: make SOA scale for >1000 services e.g. the Interface Management System (IFMS)

- **Service Catalog**
  - Uses CDM structure
  - Various search tools
  - Report engine

- **Design tool**
  - Data type repository
  - Composition tool

- **Governance enforcer**
  - Manage quality gates, reviews, obligations

- **Lifecycle management**
  - EOL notifications and reporting

- **Code generator**
  - Extensible generator
  - Linked to dev toolchains

Challenge no. 6: adapt SE lifecycle models for SOA e.g. the CS interface engineering process

New interface required

Create interface, describe purpose

QC1

Specify IF functionality & contract

QC2

Generate artifacts

Add business logic to IF realize and test

QC3

Perform IT

Perform SAT

Deploy to PROD

Specify suitable test case, test data and expected results

Generate required mocks for testing and support information for test case

Prepare test environments, run unit tests, compare with reference results

Compile test reports

Challenge no. 7: testing and versioning of interfaces

DiMA-compliant interfaces are managed in terms of versions

- Major version: the contract is related to an existing interface version but is not backward compatible
- Minor version: the contract description of the new version is compatible with all the previous interface versions

Provider

- **Major Version:** Test activities like for a new interface
- **Minor Version:**
  - Test scope like for a new interface
  - Test of backwards compatibility of contract
- ➔ **Less development effort but higher test efforts (Regression Tests)**

Consumer

- **Major and Minor Version:**
  - Test scope like for a new interface
  - Rely on backwards compatibility of contract, i.e. freedom of choice
- ➔ **Test and development efforts are equal**
- ➔ **Decoupled from interface life cycle**

Challenge no. 8: from regional to global services

Switzerland
Multiple Applications

EMEA – Today
Single Application

Global - Future
Multiple Applications

SOA

CS Information Bus

EMEA SOA

CS Information Bus (CH / World)

Switzerland
Single Backend Platform

EMEA
Multiple Backend Platforms

Global
Multiple Backend Platforms

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