Bridging the gap between an enterprise and its projects : Using the Zachman Framework to define IT Architecture

KnowFuture - Event

Bridging the gap

Agenda

- Introduction : we need Architecture Management
- The context
- Architecture Management@Swisscom Mobile
- The approach
- Some practical experiences
- Conclusions

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Our Main Message

Architecture Management with the Zachman Framework :

- *bridges the gap between an enterprise and its projects*
- *supports management of complexity (when you have to make several packages (and/or in-house developed applications) working together)*

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- **Introduction : we need Architecture Management**
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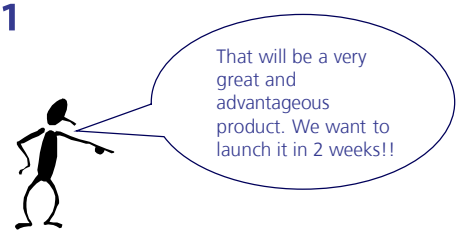
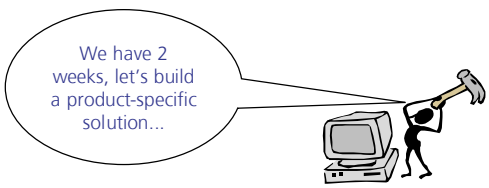
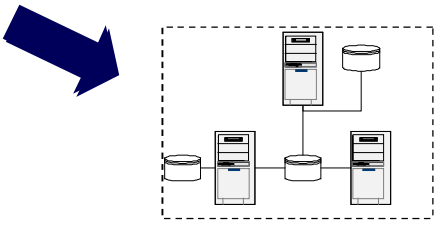
Do you know the spaghetti syndrome?

The story starts like this....
Day 1







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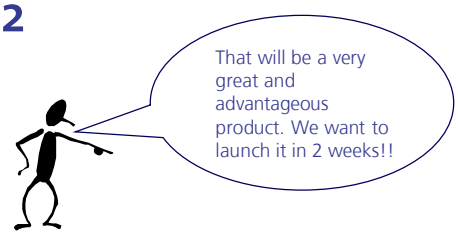
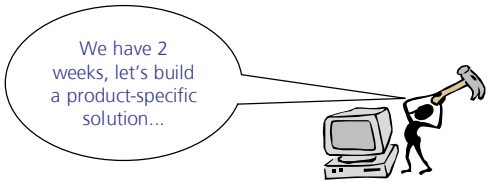
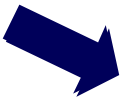
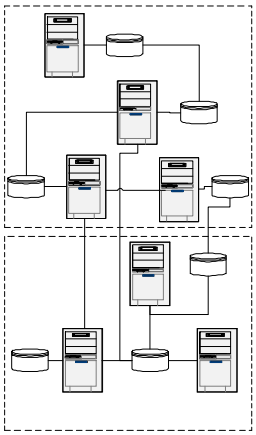
… continues like this….
Day 2









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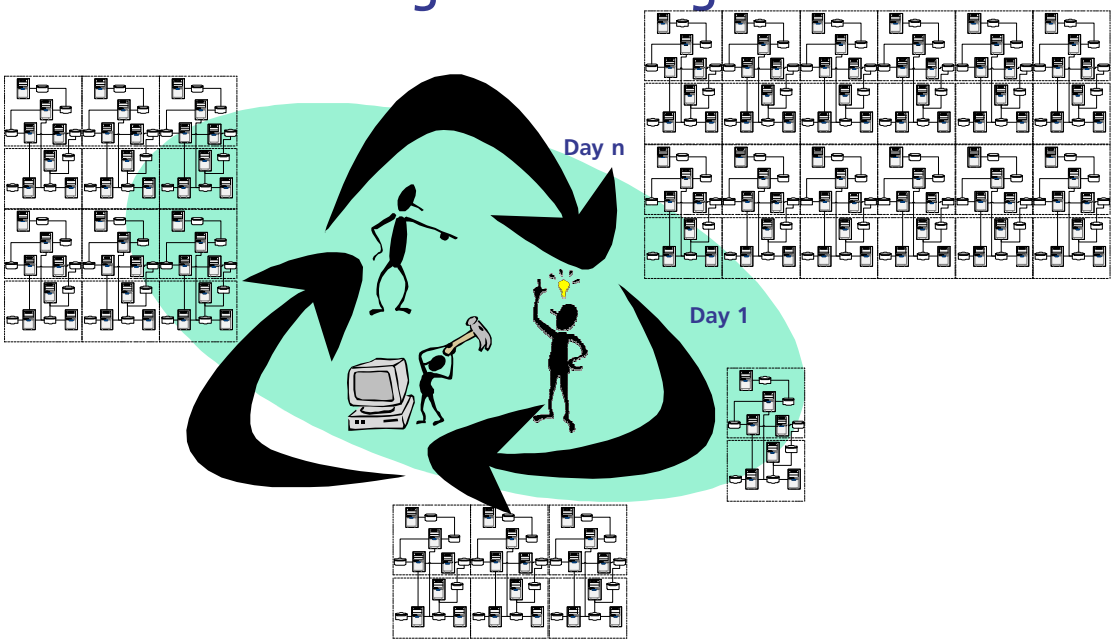
…And continues again… and again…



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...And finally : The technical landscape is like a big spaghetti plate!

§ Applications were built one-at-a-time for individual product

§ Each application was its own center of the universe
Interfacing was a necessary afterthought

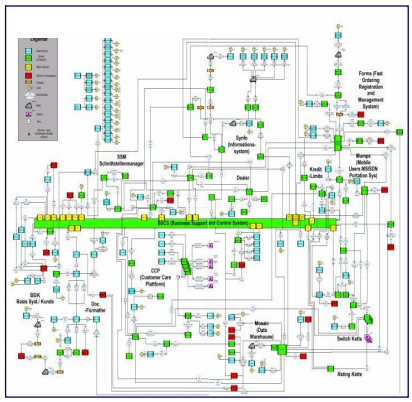
§ Each application's architecture has its own presentation, logic, and data layers

§ Many applications have their own security models and log-ins

§ Files and databases are islands and often store redundant data that is already stored in other files and databases
...etc..etc...

At each time we have to make a change we have to touch everything and we need a lot of time and resources !

Spaghetti landscape
No architecture



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In other words :

§ Projects work under high pressure : the product is for next week

§ Projects are focused in meeting deadlines, which is good by the way...

ð This create an unavoidable trend to build solutions that are project specific : "vertical solutions"

ð **At a point of time, the technical landscape is like a big spaghetti plate... and nobody takes care about the end-to-end architecture!**

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But, in the meantime, everybody wants :

Reduced time-to-market,
alignment,
integration,
flexibility,
interoperability,
quality,
seamlessness,
adaptability,
user-friendliness,
usability,
reusability,
security…..

Reduced time-to-market,
alignment,
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usability,
reusability,
security…..

How can we get this from spaghetti ?

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Solution?

"We need a managed Architecture"

§ In other words :
- We need an Architecture
- We need to manage it

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Swisscom Mobile

- § The leading mobile phone operator in Switzerland
- § 66% market share with 3.675 M customers and 2600 points of sales
- § 2002 revenue: 4112 Mio CHF
- § 2400 employees
- § 75% Swisscom AG, 25% Vodafone Group

The Swisscom Group

- § Switzerland´s leading telecom company
- § Positioned as the leading provider of mobile and fixed voice and data services and Internet-based services.
- § Offers a comprehensive range of telecom products and services
- § 2002 revenue: 14,52 Billion CHF
- § 20,470 employees

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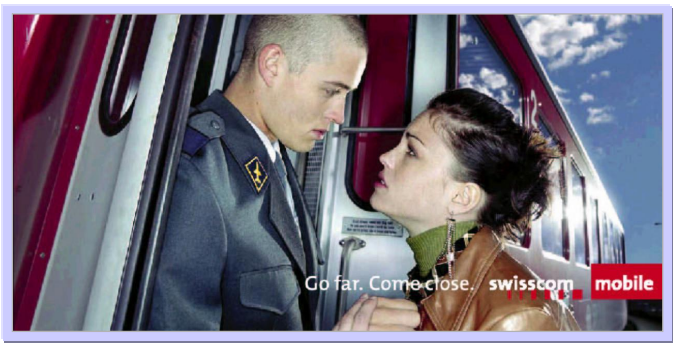
What does Swisscom Mobile provide?

- Phone calls, short message service (SMS), voice mail
- Add-on services :
  - roaming (phone calls when you are in other countries), fax and e-mails (unified messaging), call forwarding, teleconferencing…
  - Mobile phone (micro)payment
- Third party content: railway timetables, stock prices, weather, bank account information, portal of services
- Business services : Corporate Mobile Network, Mobile Office, Machine-to-machine mobile data communication
- Public Wireless LAN
- Multimedia messaging, WAP surfing
- Games – downloadable and on-line
- Prepaid and post paid billing
- … and more



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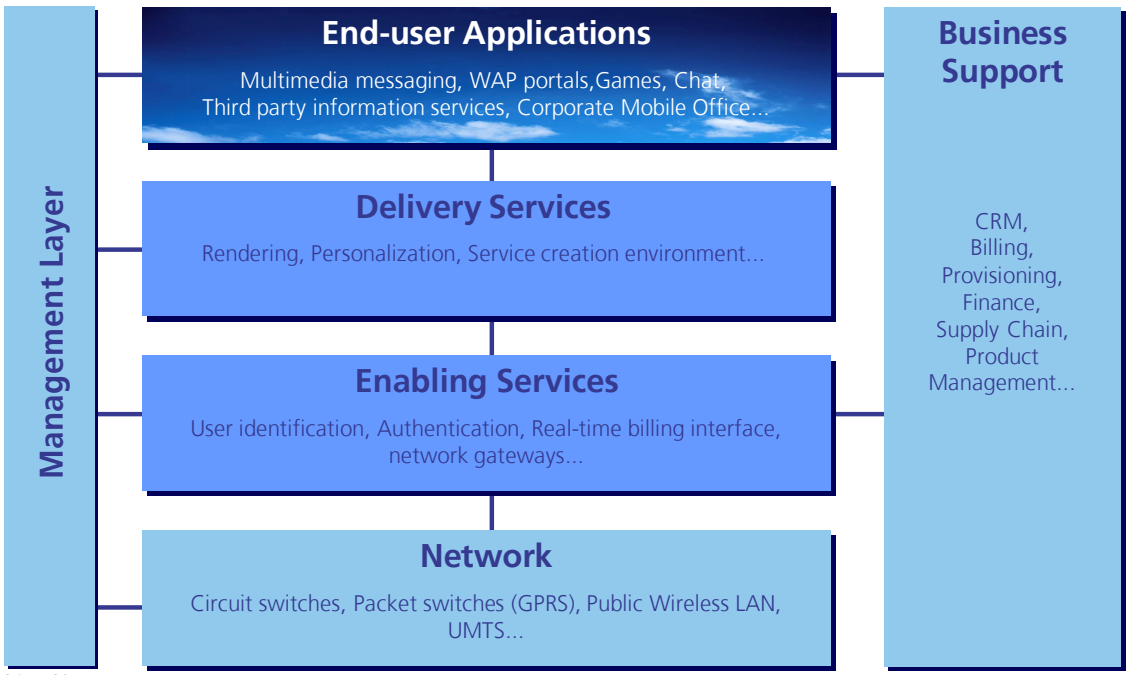
Functional layers



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Strategic Issues

- For a mobile phone company, technology is not business support or a business enabler - it is the business
- Telecom technology vendors have a dominant role in the industry
- Core technology and services are very standardised and well-served by package vendors
- Competition is in emergent value-added services:
  - It isn't feasible to develop in-house what you need to build them - you base them on packages
  - Development is mostly about configuring packages and making them work together.

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Strategic Impact of Packaged Solutions

It's vital to make the right choices for selection of packages and their accompanying technology, and for business partnerships with package vendors	**The effects are not limited to the value-added services. Underlying technology can be affected, business support systems (CRM, provisioning, billing ...) have to handle the changes**	**You can't get everything right - some solutions won't work as well as you expected, some vendors will go out of business, some solutions will be overtaken by better ones from competitors**

You need an architecture that is not specific to the packages you currently use - an architecture where you can swap old solutions for better ones.

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Architecture Management@Swisscom Mobile

- § Define and manage technical Architecture processes within the company
- § Develop and maintain technical information (conceptual level)
- § Define target Architecture including guidelines, principles and roadmap
- § Ensure synchronisation between Architecture roadmap and platform roadmaps
- § Control & report on Architecture & Security compliance of solution implementations
- § Define Security concepts. Co-ordinate, report & escalate. Responsibility is share with SCM line organisation
- § Provide support to the line in understanding Architecture & Security processes and content (End-to-End Architecture & Security)
- § Support platform introduction decision according to company priorities

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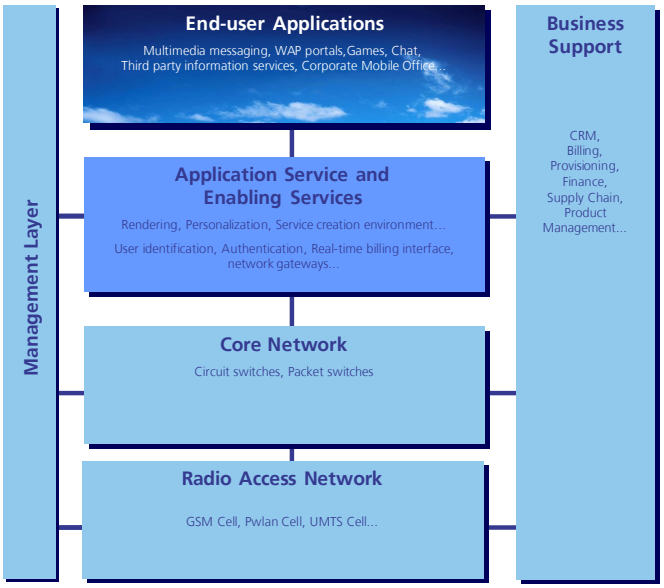
End-to-end architecture management



§ We define how to integrate systems and capabilities for the greater good of the enterprise, consistently from an end-to-end perspective : From the end-user application to the network element, through business support systems.

§ We ensure consistency between the architecture layers (e.g : between Core Network and Enabling) and detect potential conflicts between roadmaps of evolution of different domains

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Starting point

§ **The basic ideas :**
- **Define how** to integrate systems and capabilities for the greater good of the enterprise
- Define **target** architectures and **roadmaps**
- **Synchronise** architecture roadmaps with platform roadmaps
- **Support** projects in identifying platform impact and designing solutions compliant with the architecture
- **Review** projects in terms of alignment against the defined architecture

§ **Findings :**

(We need :)
- **Descriptions** of current (over time changing) and target architectures, which must :
  - Provide **reference** and content
  - **Support** control of project architecture compliance
- Architecture Management standardised processes and activities, using this **Reference Architecture**

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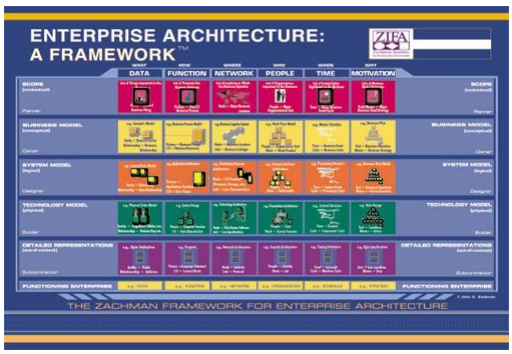
Starting point and guide : The Zachman Framework



§ A framework is a classification scheme that enables focused concentration on selected aspects of subject or object.

§ It is useful for :
- simplify for understanding and communication
- clearly focus on independent variables for analytical purposes
- maintained a disciplined awareness of contextual relationships that are significant to preserve the integrity of the object

§ The **Zachman Framework** is a classification scheme for descriptive representations of complex objects.

§ It is generic and can be used to classify the descriptive of any object : an enterprise, a product…

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ENTERPRISE ARCHITECTURE - A FRAMEWORK ™

	DATA What	FUNCTION How	NETWORK Where	PEOPLE Who	TIME When	MOTIVATION Why	
SCOPE (CONTEXTUAL) Planner	List of Things Important to the Business ENTITY = Class of Business Thing	List of Processes the Business Performs Process = Class of Business Process	List of Locations in which the Business Operates Node = Major Business Location	List of Organizations Important to the Business People = Major Organization Unit	List of Events/Cycles Significant to the Business Time = Major Business Event/Cycle	List of Business Goals/Strategies Ends/Means = Major Business Goal/Strategy	SCOPE (CONTEXTUAL) Planner
BUSINESS MODEL (CONCEPTUAL) Owner	e.g. Semantic Model Ent = Business Entity Rein = Business Relationship	e.g. Business Process Model Proc. = Business Process I/O = Business Resources	e.g. Business Logistics System Node = Business Location Link = Business Linkage	e.g. Work Flow Model People = Organization Unit Work = Work Product	e.g. Master Schedule Time = Business Event Cycle = Business Cycle	e.g. Business Plan End = Business Objective Means = Business Strategy	BUSINESS MODEL (CONCEPTUAL) Owner
SYSTEM MODEL (LOGICAL) Designer	e.g. Logical Data Model Ent = Data Entity Rein = Data Relationship	e.g. Application Architecture Proc. = Application Function I/O = User Views	e.g. Distributed System Architecture Node = I/S Function (Processor, Storage, etc) Link = Line Characteristics	e.g. Human Interface Architecture People = Role Work = Deliverable	e.g. Processing Structure Time = System Event Cycle = Processing Cycle	e.g. Business Rule Model End = Structural Assertion Means = Action Assertion	SYSTEM MODEL (LOGICAL) Designer
TECHNOLOGY MODEL (PHYSICAL) Builder	e.g. Physical Data Model Ent = Segment/Table/etc. Rein = Pointer/Key/etc.	e.g. System Design Proc = Computer Function I/O = Data Elements/Sets	e.g. Technology Architecture Node = Hardware/System Software Link = Line Specifications	e.g. Presentation Architecture People = User Work = Screen Format	e.g. Control Structure Time = Execute Cycle = Component Cycle	e.g. Rule Design End = Condition Means = Action	TECHNOLOGY MODEL (PHYSICAL) Builder
DETAILED REPRESEN-TATIONS (OUT-OF-CONTEXT) Sub-Contractor	e.g. Data Definition Ent = Field Rein = Address	e.g. Program Proc = Language Statement I/O = Control Block	e.g. Network Architecture Node = Address Link = Protocol	e.g. Security Architecture People = Identity Work = Job	e.g. Timing Definition Time = Interrupt Cycle = Machine Cycle	e.g. Rule Specification End = Sub-condition Means = Step	DETAILED REPRESEN-TATIONS (OUT-OF-CONTEXT) Sub-Contractor
FUNCTIONING ENTERPRISE	e.g. DATA	e.g. FUNCTION	e.g. NETWORK	e.g. ORGANIZATION	e.g. SCHEDULE	e.g. STRATEGY	FUNCTIONING ENTERPRISE

John A. Zachman, Zachman International

Bridging the gap between project : Architecture Management with the Zachman Framework

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The Zachman Framework for Enterprise Architecture : Fundamentals

- Use the Framework as a classification scheme for descriptive representations of an Enterprise
- **Different perspectives**
  - Planner : Objectives / scope
  - Owner : Model of business
  - Designer : Model of information system
  - Builder : Technology Model
  - Sub-contractor : detailed representation
- **Different abstractions** (different ways to describe the enterprise**)**
  - What : Material description - Data
  - How : Functional description - functions and processes
  - Where : Spatial description - Flows
  - Who : Operational description - People / workflow
  - When : Timing description - Dynamics / Events
  - Why : Motivation description - Strategies

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The Zachman Framework for Enterprise Architecture : Fundamentals

Rules of the framework

- Do not add rows or columns to the framework
- Each column has a simple generic model
- Each cell model specialises it's column generic model
- Level of detail is a function of a cell not a column
- No meta-concept can be classified into more than one cell

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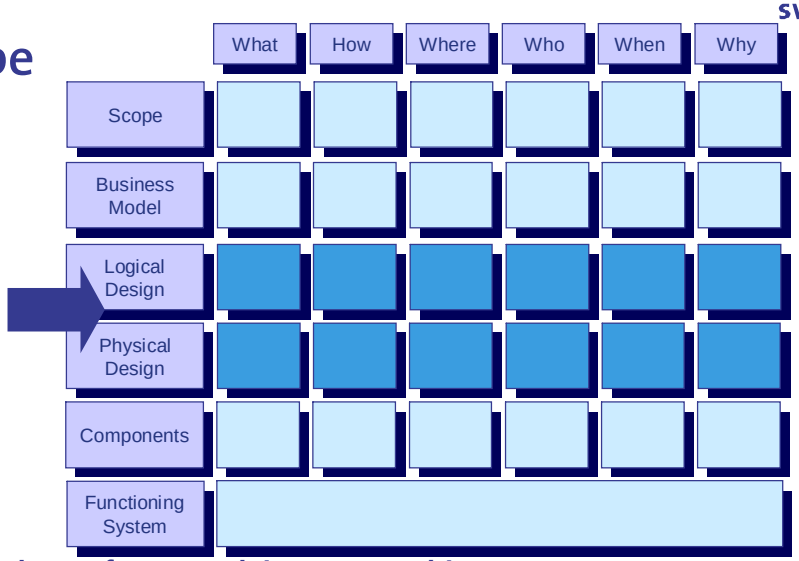
Scope



- **The Zachman framework is not an architecture**.

It is a **classification scheme** for organising and managing architecture. We are using it as our reference framework:

- To organise the perspectives and aspects of the architecture we have identified
- To organise what we already have, look for gaps, identify what we need, and prioritise its development

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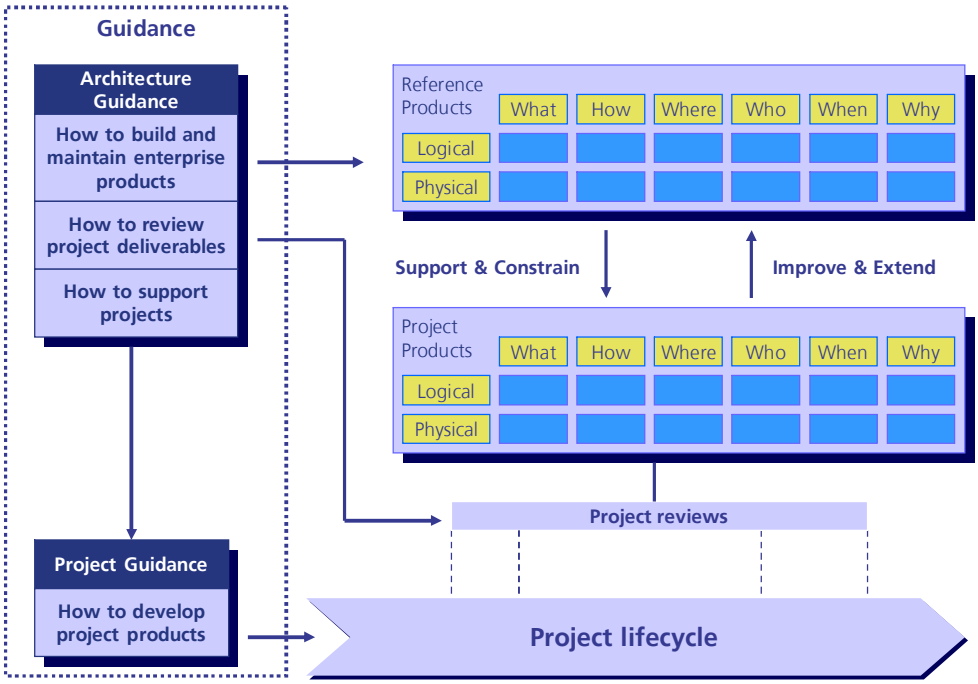
Two Frameworks



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Two Frameworks

Architecture Framework	Project Framework
§ Contains reference products that together define the overall architecture	§ Contains descriptions of project deliverables, which may be composites i.e. may span more than one Framework cell
§ Each reference product is primitive and contained within one Zachman cell	§ Descriptions of deliverables are not prescriptive but there is guidance on what kinds of deliverable would be expected in different types of project
§ Reference products grow incrementally as projects gradually realize the target architecture	§ Framework cells define characteristics and properties that must be present in the deliverables to establish architectural compliance
	§ Projects produce deliverables that meet the framework specifications

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Architect's roles in projects

- Consultant to Solution Architect – second opinion on solutions
- Support for defining project-specific instance of framework:
  - Kinds of deliverable recommended: may be composites
  - Required properties of deliverables ["*You should be able to answer these questions*"]: based on reference products, specific to Framework cells
- Support of project team during development:
  - Using reference products as sources of content
  - Using reference products as constraints
- Assessment of architectural compliance

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Where have we got to ?

Coaching / mentoring approach with Know Gravity

- Initial decision: start with CRM and EAI Bus
- One year architecture program management - established control and consistency over initial projects
- Creation of an architecture governance process
- **Selection of the Zachman Framework**
- Creation of architecture definition within the Framework
- Development of guidance
  - for using the architecture definition in projects
  - for ensuring compliance of projects with the architecture
- Applying the guidance on projects

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Step 1 : take into account issues due to the specific context (1)

Issue	Solution Approach	Framework
There is an "ideal" set of packages that would match closely the capabilities of the conceptual applications - but this set is a moving target	Drive the logical application architecture from business requirements Maintain mappings to both target and current physical application architecture Maintain detail of physical architecture in current – keep the target definition "light"	Logical and physical "How" models
Delivering required functional capabilities using the facilities of the available packages - may have options to map functions to more than one package.	Make selections and use the Framework to ensure they are applied consistently	Logical and physical "How" and "Why" models
Packages need to support business view of data	Enterprise Data Model visible to Business Model owners & mapped to application package databases	Logical and physical "What" models
Many applications need their own databases and some data has to be replicated	Enterprise Data Model mapped to package data bases. Primary owner application defined for replicated data Replication defined and managed in physical models	Logical and physical "What" models, Physical "Where" model

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Step 1 : take into account issues due to the specific context (2)

Issue	Solution Approach	Framework
Swappable solutions enabled by EAI	Enterprise Message Model to control that the EAI Bus is used consistently across projects.	Logical and physical "Where" models
It is not possible to phase everything to fit neatly over time. We have to develop interim solutions in some areas.	Interim solutions are swapped in and out in the same way as replacement of parts of the current architecture by parts of the target architecture	Physical "What", "How" and "Why" models
Neither projects nor application support teams have the end-to-end view of support for business processes	End-to-end workflow models (with both human and automated actors) are built, and kept consistent with the "How" and "Where" models. These models are owned by the architecture team, and kept in step with the end-to-end view of business process in the business models	Logical and physical "Who" models,
There are many constraints on the use of packages. Some are inherent in the packages themselves and some resulting from Swisscom Mobile design decisions	Design decisions (and the rationales for them) and package constraints are documented in the "Why" column. They result in constraints and guidance that impact other columns, especially "What" and "How". It's vital to make this information readily available to projects in concise form.	Physical "What", "How" and "Why" models

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Step 2 : define the Reference products

	What	How	Where	Who	When	Why
Logical Design	Enterprise Data Model (EDM) Logical Data Catalog	Conceptual Application Architecture Data Ownership	Logical Message Model Logical Message Catalog	Logical Workflow Actors	Entity Behaviour models Business Event Catalog	Logical Architecture Rules
Physical Design	Application Package DB Specifications EDM Mapping . Data Catalog Mapping	Current and Target Application Architectures Physical Master/Slave Relationships	Physical Message Model Physical Message. Catalog Integration Manager Specification	Enterprise Workflow Model	System Event Catalog	Application Package Constraints Permitted Technologies & Tools

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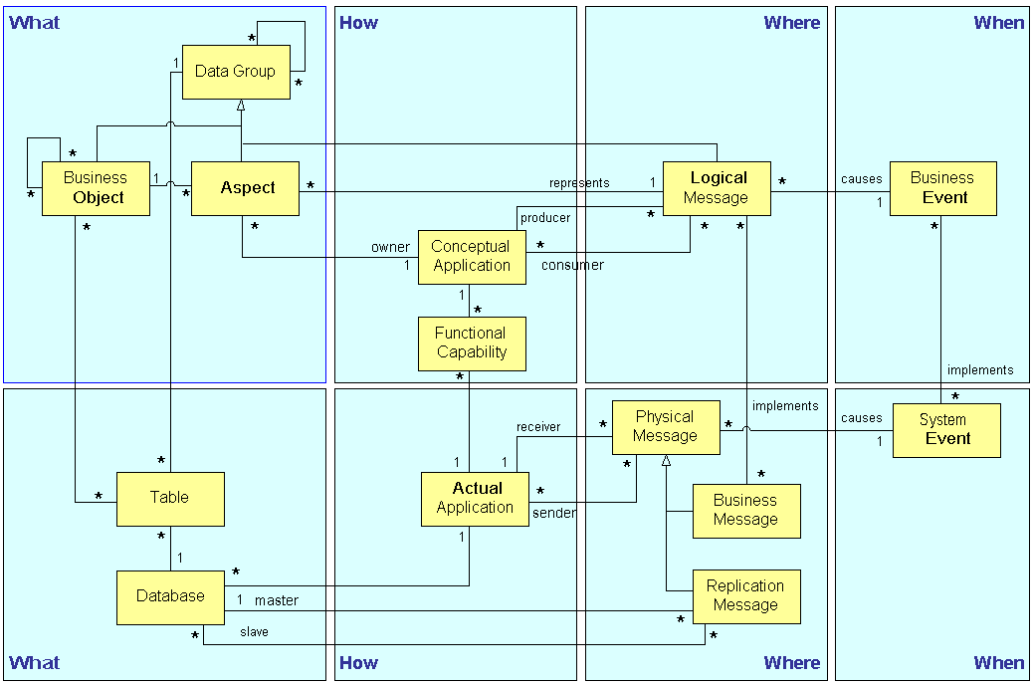
Simplified Meta-model of Reference Products

Logical View (Row 3)

Physical View (Row 4)



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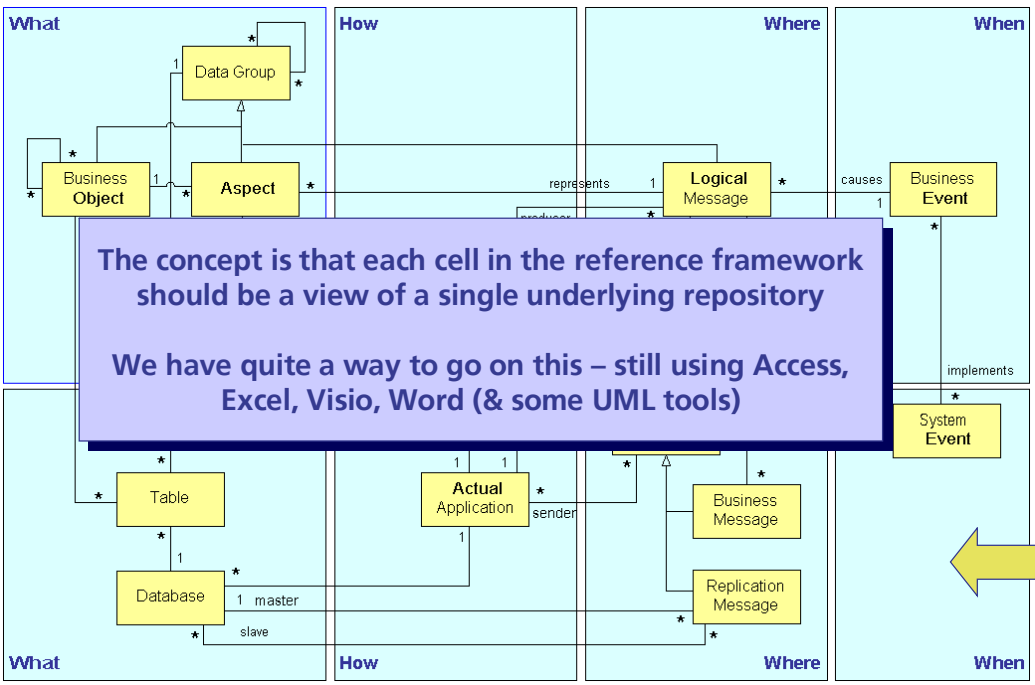
Simplified Meta-model of Reference Products

Logical View (Row 3)

Physical View (Row 4)



The concept is that each cell in the reference framework should be a view of a single underlying repository

We have quite a way to go on this – still using Access, Excel, Visio, Word (& some UML tools)

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Step 3 : Build reference products

Examples of reference products

§ Enterprise Data Model

§ Logical Data Catalogue

§ Enterprise Message Model

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Roles of Enterprise Data Model

§ The Enterprise Data Model (EDM) is a tool for defining a set of concise, unambiguous, stable, and IT-independent definitions of an organisation's information resources. It specifies:
  – The significant objects that an organisation needs to hold information about (these are called entities)
  – The way that these objects relate to each other, (these are called relationships)
  – The key facts that the organisation wants to know about these objects (these are often called attributes)
  – The business rules that govern the relationships between these objects

§ Enables:
  – Selection of packages that support business views of the data
  – Mapping those views to the packages' databases

§ Supports "primary ownership" of data by conceptual applications - is basis for master/slave data relationships in physical design

§ Also used by business people (row 2 owners) for reference

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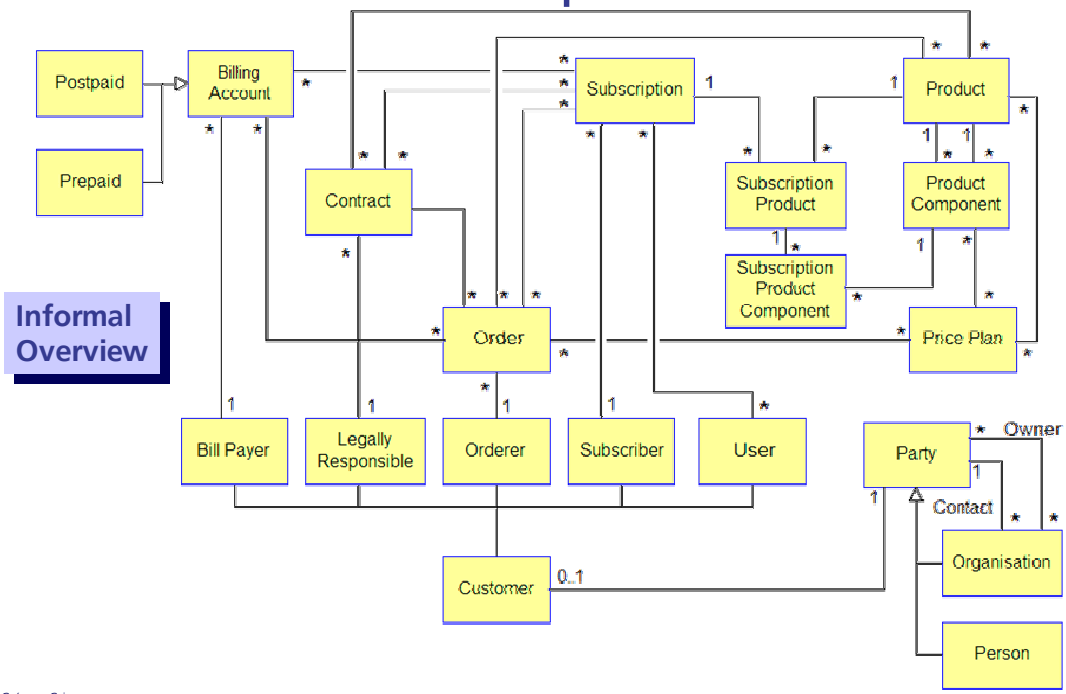
Reference Product: Enterprise Data Model



Informal Overview

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Logical Data Catalogue

- The primary purpose of the Logical Data Catalogue is to identify reusable logical groups of data across the whole SCM Architecture on a logical (conceptual) level. In contrast to the physical (technical) level, the logical (conceptual) level :
  - is completely implementation independent, i.e.
    - clean of design decisions, such as application partitioning, data replication, etc.
    - not biased towards any specific technology, such as databases
  - is stated in a business readable manner

- Data groups are "building blocks", reusable across business objects, tables, and logical and physical messages
- Mapping to messages and physical databases is managed by data group, not by data item

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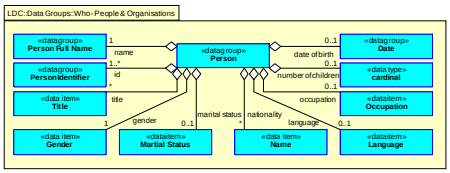
Logical Data Catalogue : Abstract

Primary name	**Person**		
Synonyms	(none)	**Generalisation**	(none)
Definition	The representation of a natural person (human being).		
Item roles	**Data definition**	**Definition**	**Role constraints**
party	Party	Details about the person as a party.	• mandatory
id	Person Identifier	Identifier to uniquely identify that person.	• mandatory, many
name	Person Name	(as defined in data definition)	• mandatory
title	Title	(as defined in data definition)	• optional, many
gender	Gender	(as defined in data definition)	• mandatory
marital status	Marital Status	(as defined in data definition)	• optional
nationality	Name	The born nationalities of that person.	• optional, many
date of birth	Date	The official date when the person was born.	• optional
language	Language	(as defined in data definition)	• optional
occupation	Occupation	(as defined in data definition)	• optional
number of children	cardinal	The number of immediate descendants of that person.	• optional
Group constraints	• (none)		
Structure			
Sources	• [EDM2]		

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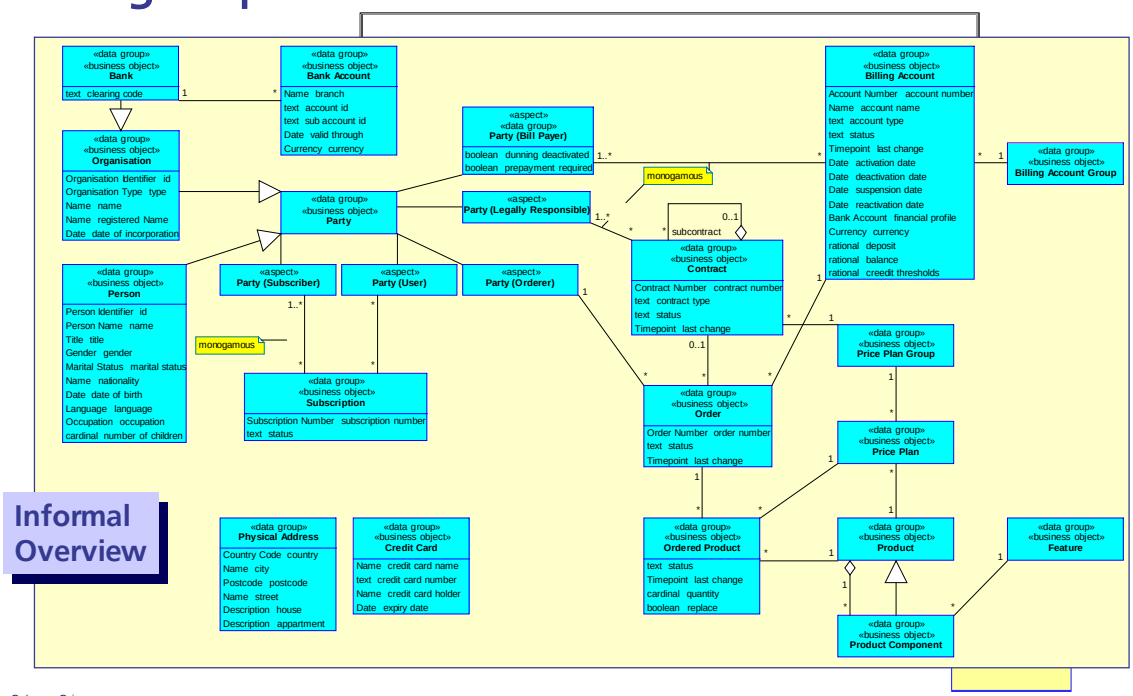
Data groups



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Reference Product example: Logical Message

The primary purpose of the Enterprise Message Model is to identify reusable message types across the whole SCM Architecture on a logical (conceptual) level.

Primary name	**Customer Address changed**				**Type**	NoC
Synonyms	ADDRESS_MUTATION		**Generalisation**		(none)	
Definition	One or more detail of the customer's address has been changed					
Avg. Frequency	2000		**per**		month	
Periodic:		**One Target:**		**Transactional:**	X	
Episodic:	X	**Many Targets:**	X	**Non-transactional:**		
Item roles	**Data definition**	**Definition**		**Role constraints**		
person id	Person Identifier	Identifier to uniquely identify the person who's address has changed		• optional		
organisation id	Organisation Identifier	Identifier to uniquely identify the organisation who's address has changed		• optional		
change	Change Type	(as defined in data definition)		• mandatory		
effective date	Date	The date on which the requested change becomes valid.		• mandatory		
physical address	Physical Address	(as defined in data definition)		• mandatory		
Group constraints	• defined(person id) xor defined(organisation id)					
Producers	• CRM					
Consumers	• OM • Billing • Collection • Provisioning					

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Agenda

§ Introduction : we need Architecture Management

§ The context

§ Architecture Management@Swisscom Mobile

§ The approach

§ Some practical experiences

§ **Conclusions**

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Conclusions

- The Zachman Framework provides a holistic view on the enterprise and helps to identify gaps
- The Zachman Framework is even then helpful, when you plan to use commercial packages instead of developing the IT infrastructure by yourselves
- Adapting the Zachman Framework to company-specific needs allows the definition of artefacts to be delivered by projects required for architecture governance
- Reference products provide a "quick-start" solutions for required artefacts
- Reference products are highly reusable and reusability should be a primary goal
- Project products are means to check architecture compliance
- Projects must be treated as "customers" from the architectural governance perspective
- A common language (such as UML) is very helpful
- Coaching/mentoring on Zachman and architecture is helpful and much more efficient in changing the culture than direct support.

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Thank you for your attention

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