Creating a best fit between Business Strategy and Web Services Capabilities using Problem Frames Modeling approach
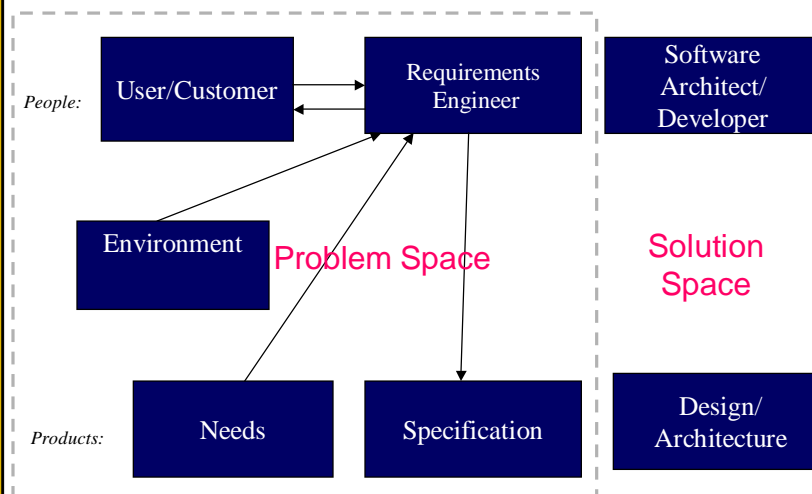
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Problem Description

- Much of Requirements engineering for Web services research concentrates on the **'late-phase'** requirements engineering and focuses on producing a specification document to pass on to the developers.

- Less attention has been paid to describe the **real world problems** and the **business objectives** of an organisation deploying Web services.

- Requirements engineering community has not realized the importance of aligning Web services initiative with **business strategy**, **business goals** and **business objectives** as much as it should be.

What do we Propose?

We propose a strategy-oriented methodology that:

1) Is designed to support the business strategy of a firm that is leveraging Web services initiative.
2) Provides a roadmap from business strategy to the strategic objectives in four dimensions: **service innovation**, **customer relationship management**, **infrastructure management** and **financials.**
3) Uses **Progression of Problems** to understand the strategic objectives, business needs and business context of Web services from strategy to implementation.
4) Uses **Problem frames** to describe the operational needs and the Web services context.

Research Questions

- **RQ1: Is it possible to describe a business to IT problem in the context of requirements for Web services?**
- **RQ 2: Is it possible to describe the business context, business requirements and problem domain of an organisation adopting Web Services through appropriate requirements engineering framework?**

**This research question leads to a sub research question:**

- Is it necessary to describe the business and problem context for Web services?

  - Industry Research shows that a good grasp of the **business context** and **domain context** of Web services is needed before describing the specifications.

  - There are several requirements engineering frameworks that could be used but not all are appropriate to describe the **business context**, **business requirements** and **problem domain** for Web services adequately.

An Overview

- A **requirement** is a condition or capability needed by the user to solve a problem or achieve an **objective.**

- A Web service is a **capability** that an organization would deploy to meet its business objective.

Overview of problem Frames

Problem frames classify software developments problems.
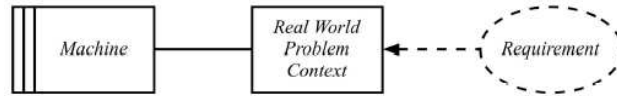
- It describes what is in the **real world** and how the intended software will change or guarantee real world conditions in accordance with the requirements.
- The real world **problem context** provides information about the structure, processes and tasks that are true of the problem domain.
- **Requirements** states which properties we wish to be true given a built software solution, which is the **machine**.

Progression of Problems
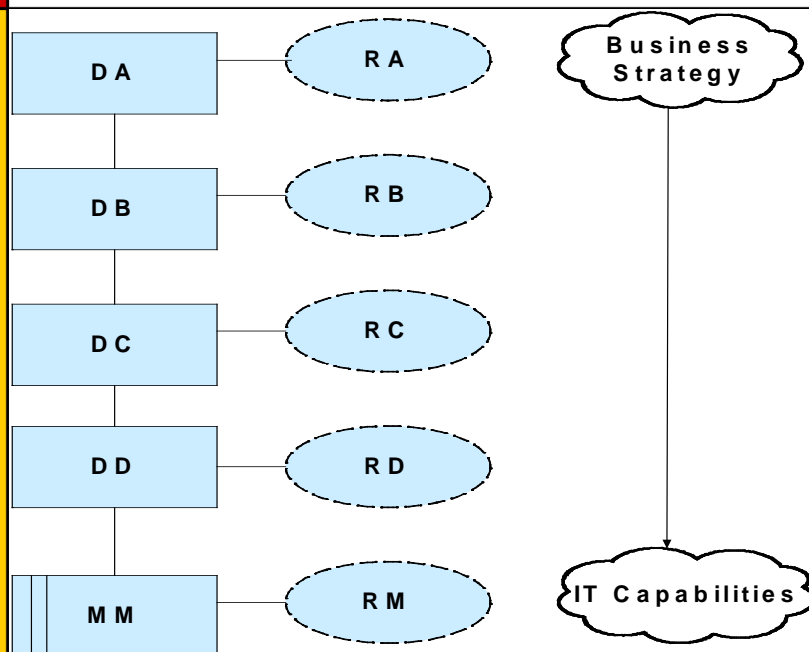
RE Methodology
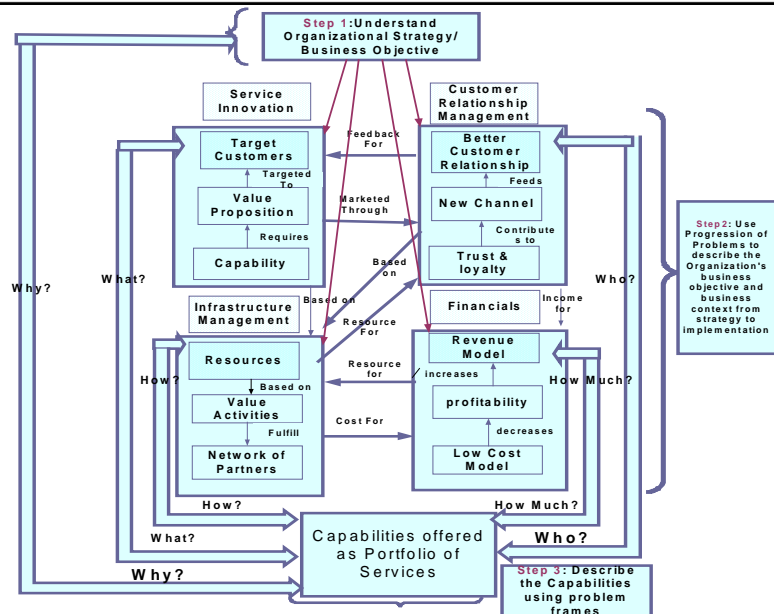
RE Methodology..(cont)

1) This methodology provides constant support to the business strategy and helps understand what capabilities the firm holds, how can it innovate, improve customer relationship and profitability goals.

2) This methodology helps align Web services capabilities to the business strategy.

An example of our analysis : Amazon Web services

- Amazon Web services is a business unit within Amazon.com that exposes the service capabilities to its business partners for a commission.
- Some of the Amazon's WS *capabilities offered to the associates are:*
- **Product details** and **pricing information** for virtually all products in the Amazon catalog.
- Extended Search: Associates can use Amazon's 'Advanced Search' functionality to search by multiple attributes like brand, price and category.
- Remote Shopping Cart: Amazon allows associates to add Amazon's Shopping Cart functionality to their own website.

Step 1: Understand Amazon's Business strategy

- Amazon's mission is to increase market share by exposing their products to end-customer.

- Amazon has created a Web API that allows associates(business partners) to incorporate Amazon's features into their website.

From eBMO to Progression of Problems

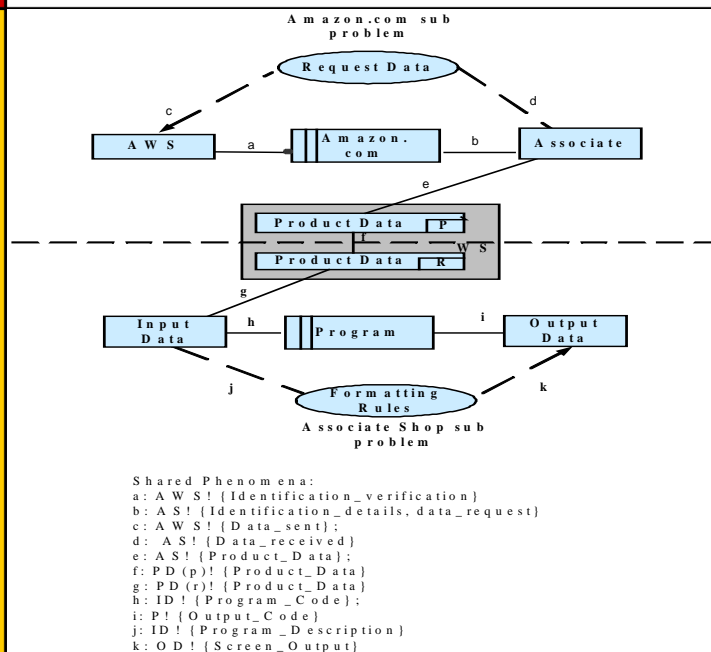| Dimensions	Strategic Objectives/Operational objectives	Context	Progression of Problems
1) Service Innovation	**Strategic Objectives:** 1) *Service Innovation* 2) Target innovative services to the *target customer*. 3) *Value proposition* to the customers 4) Value capabilities offered to the Associates. **Operational Objectives:** Embed Web service capabilities into the Associate shop front	1) Amazon.com 2) Amazon Web services. 3) Associate 4) Web Services 5) Associate Shopfront	POP (1)
2) Customer Relationship Management	**Strategic Objectives:** 1) Improve *Customer Relationship* 2) *New channels* are offered by Amazon web services. 3) *Trust and loyalty* between Partners 4) *New Business Opportunities* to the Associates. **Operational Objectives:** Embed Web service capabilities into the Associate shop front	1) Amazon.com 2) Amazon Web services. 3) Associate 4) Web Services 5) Associate Shopfront	POP (2)
3) Infrastructure Management	**Strategic Objectives:** 1) *Infrastructure Management* 2) *Resources* offered by Amazon Web services. 3) *Resources* made available to Network of Partners. 4) *Value activities* to make capabilities available **Operational Objectives:** Embed Web service capabilities into the Associate shop front	1) Amazon.com 2) Amazon Web services. 3) Associate 4) Web Services 5) Associate Shopfront	POP (3)
4) Finanacials	**Strategic Objectives:** 1) *Increase profitability* 2) Have a *Low cost Model* 3) *New revenue streams* to the associates. 4) *Low cost capabilities offered to the customers* **Operational Objectives:** Embed Web service capabilities into the Associate shop front	1) Amazon.com 2) Amazon Web services. 3) Associate 4) Web Services 5) Associate Shopfront	POP (4)

Step 2: Understand Amazon's business objective and business context from strategy to implementation

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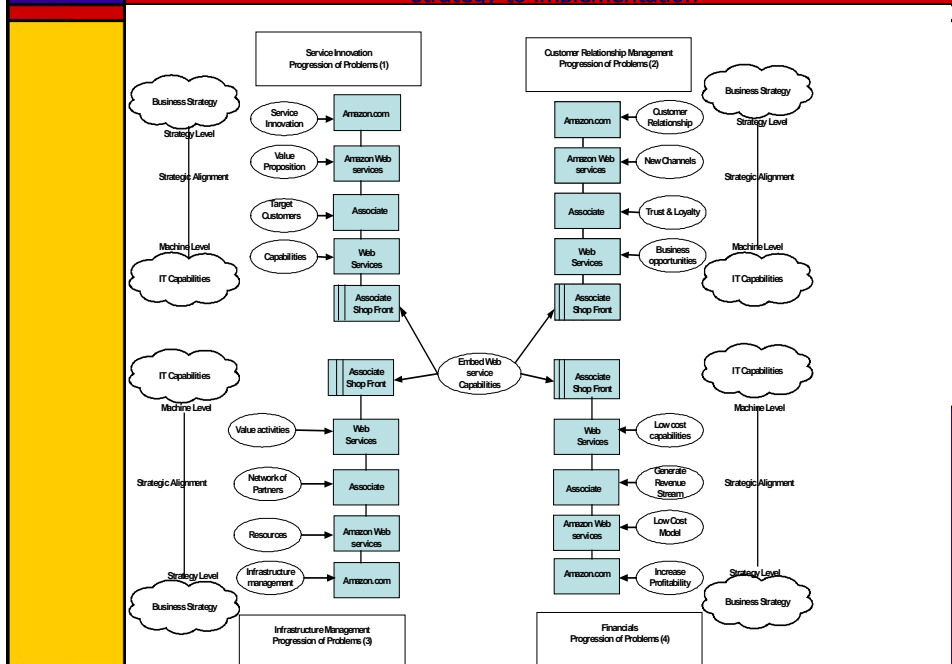
Step 3: Describe the capabilities as portfolio of services using Problem Frames

- Once the associate accepts Amazon web service's value proposition it is all set to select appropriate capability at the 4th layer of Progressions diagram.
- **We use Problem frames to explicitly describe:**
  - The business service capability provided.
  - Application-to-Application interaction.
  - The problem context and the domain in which the service operates.
  - The outward description of the interfaces between the problem domain and the software that will integrate the interfaces.
  - How the service consumer will use the capability.
  - We describe Amazon's capability using Problem frames.

Example of Amazon-Associate relationship


```
Shared Phenomena:
a : A W S ! { Identification _ verification }
b : A S ! { Identification _ details, data _ request }
c : A W S ! { Data _ sent } ;
d : A S ! { Data _ received }
e : A S ! { Product_ Data } ;
f : P D (p)! { Product_ Data }
g : P D (r)! { Product_ Data }
h : ID ! { Program _ Code } ;
i : P ! { Output_ Code }
j : ID ! { Program _ Description }
k : O D ! { Screen _ Output }
```

Which quality features are addressed by the paper?

- This research proposes a strategy-oriented methodology that creates a best fit between the business strategy and the Web service capabilities
- It captures Web services as capabilities using Problem frames.
- It aims to capture the strategy/business objectives of an organization using Progression of Problems.
- It provides a roadmap from business strategy, to the strategic objectives in four dimensions: innovation, customer relationship management, infrastructure management and financials to implementation.

What is the main novelty/contribution of the paper?

- Progression of Problem is used to describe the alignment between Amazon's strategy and IT capabilities it chooses to offer to to the outside world.
- We also show how Web Services context and requirements can be described as Problem Frames.

How will this novelty/contribution improve RE practice or RE research?

The fundamentally important purpose of this work is to realize the significance of aligning Web services initiative with the strategic objectives.

The requirements engineers need to take a deeper look at the firm's business strategy, business needs and how to create alignment between the firms business strategy and the Web service capabilities.

Can the proposed approach be expected to scale to real-life problems?

Application on a live project is the next step in testing the idea's scalability.