



# Maximize your Business Impact as an Architect

Eltjo R. Poort  
Tutorial at SATURN 2014, Portland OR

# The business value of architecture

## Applying risk- and cost-driven architecture



# Eltjo Poort

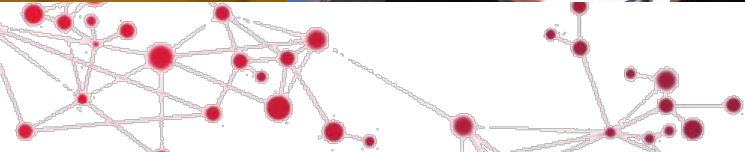
<http://eltjopoort.nl>

CGI Architecture Community of Practice lead

- Reviewing Bids & Projects
- Standardizing & Improving Architecture Practice

Researcher

- Improving Architecture Practices
- With Universities (VU, Twente, Utrecht, Eindhoven)
- Member of IFIP WG 2.10 Software Architecture





# Introductions

Name, organisation, role

Experience, recent projects

Personal details (as desired)

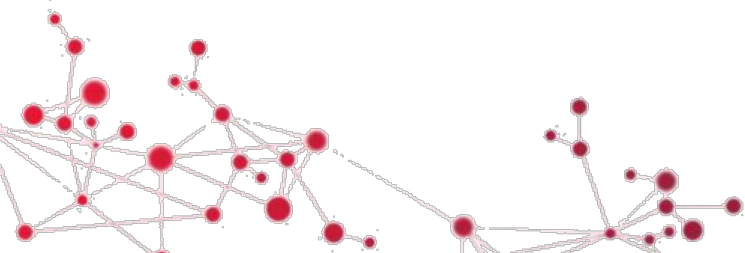


# The Business Value of Architecture

## Quantified by research\*

Result	Improvement by applying Solution Architecture	
Budget predictability	2-3 x better	Std dev 32 → 13
Budget overrun	7 x less	22% → 3%
Time overrun	6 x less	48% → 8%
Troubled projects	3 x less	38% → 13%
Customer satisfaction	1-2 points better	10 point scale
Results delivered	+10%	

\*Survey among 49 software development projects between €50,000 and €2,500,000. Reported by Raymond Slot, PhD Thesis, 2010.



# RCDA Risk and Cost Driven Architecture

Solution architecting principles and practices based on a view of architecture as a risk and cost management discipline

- Applicable in agile and traditional engagements
- Highly scalable and pragmatic
- Architectural decision making based on economic trade-offs
- Architecture communication in economic terms
- Traceability from requirements to cost



# RCDA Principles

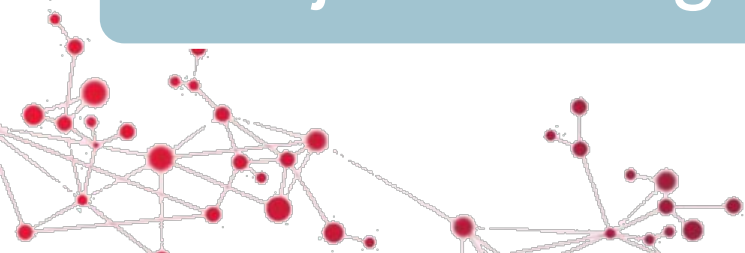
Decisions are your main deliverable

Keep a backlog of architectural concerns

Let economic impact determine your focus

Keep it small

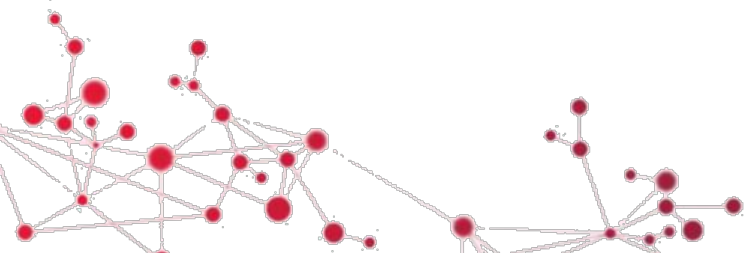
Use just enough anticipation



# Decisions are your main deliverable

## Focus on Architectural Decisions

- Convey change
- Convey implications
- Convey rationale & options
- Ease of traceability
- Agile documentation





# The Architect's Daily Job

## Architecting Microcycle

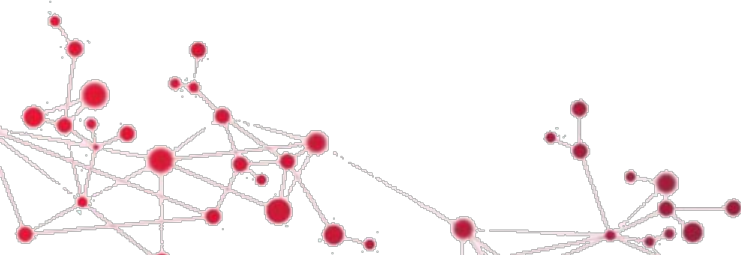
Identify & prioritize architectural concerns

Decide best fitting solution

Research possible solutions

- What problems should I work on?
- What are my options?
- I'll pick this one

Solution Architect



# RCDA Principles

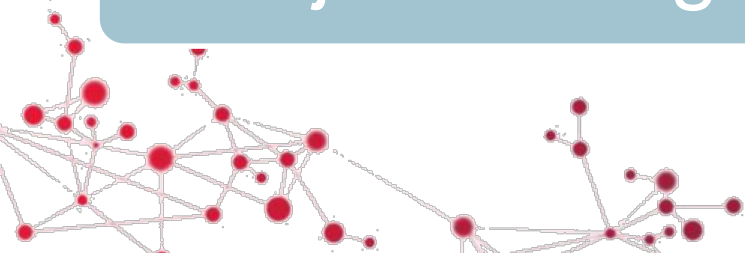
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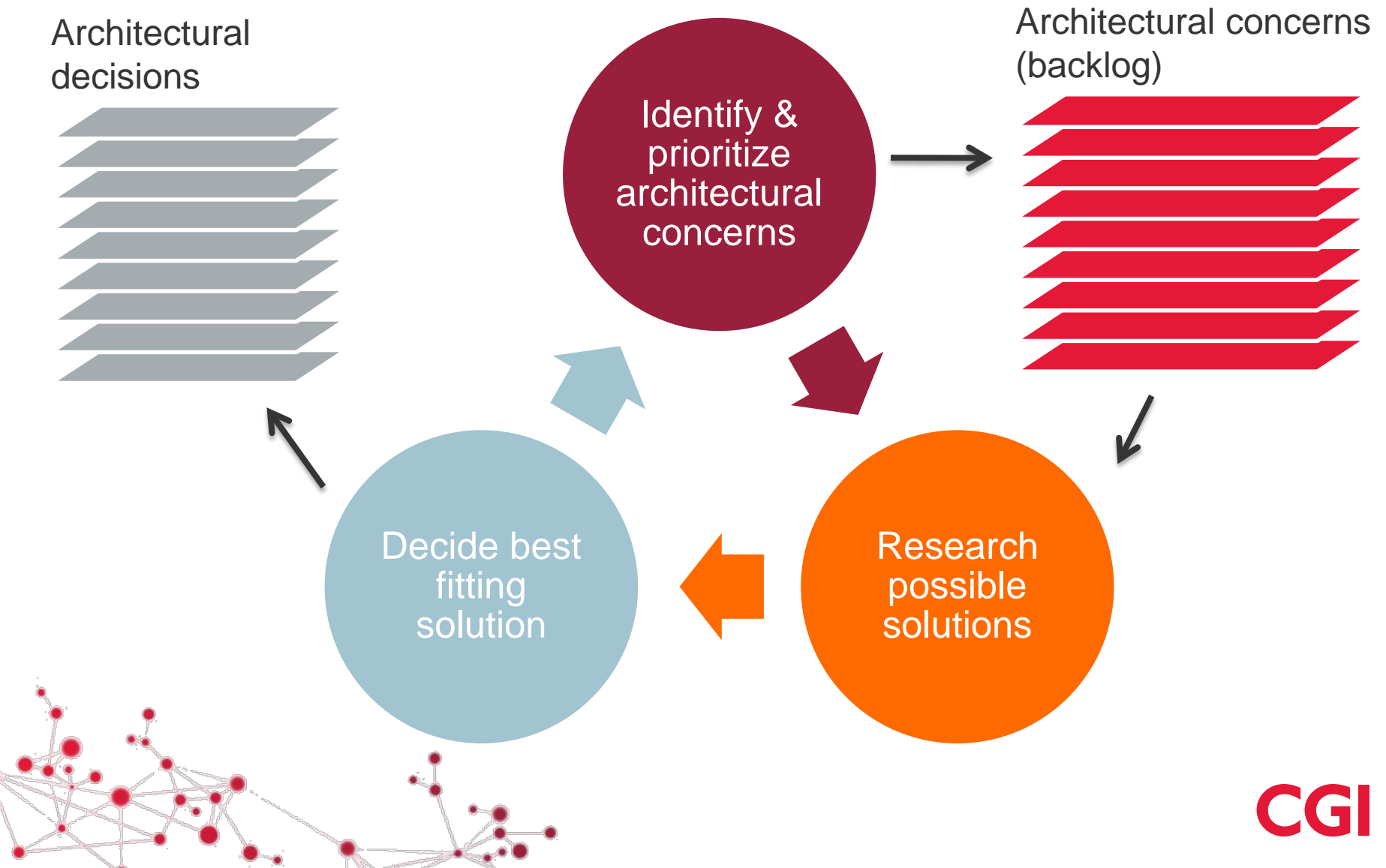
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# The Architecting Workflow



# RCDA Principles

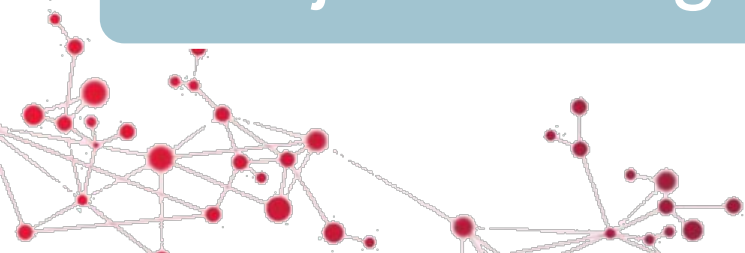
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# What is architecture about?

“**Fundamental** concepts or properties of a system in its environment embodied in its elements, relationships, and in the **principles** of its design and evolution”.

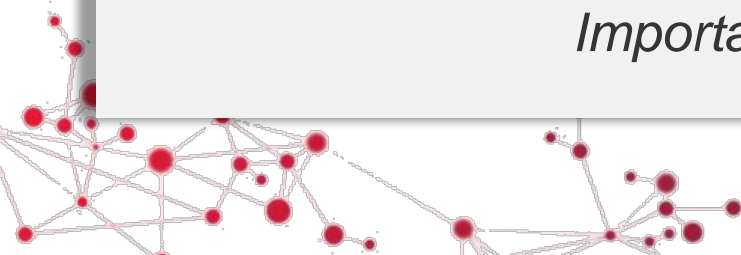
[ISO/IEEE]

“Architecture is about the **important stuff**. Whatever that is.”

[Fowler]

After talking to architects and stakeholders on dozens of projects, we have come to equate the “important stuff” with the stuff that has most impact on **risk** and **costs**.

*Important  $\leftrightarrow$  high risk and cost*





# Architecture as a Risk- and Cost Management Discipline

Managing Cost and Risks is architecture's **primary business goal**

Cost and Risks are **prioritizing factors** determining architect's concerns

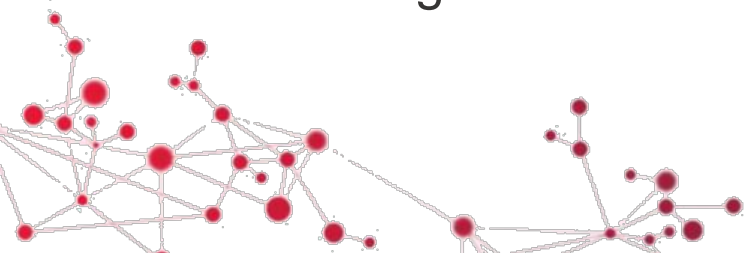
Architect should be an expert on costing and risk mitigation

## Architecture as a risk mitigation mechanism

- Reduce uncertainty in feasibility of solution
- Reduce troubled projects

## Architecture as a cost control mechanism

- Better predictability of solution cost
- Less budget overrun



# Stakeholder Communication

## Architecture in terms of Risk and Cost

Many stakeholders not used to traditional architectural terms

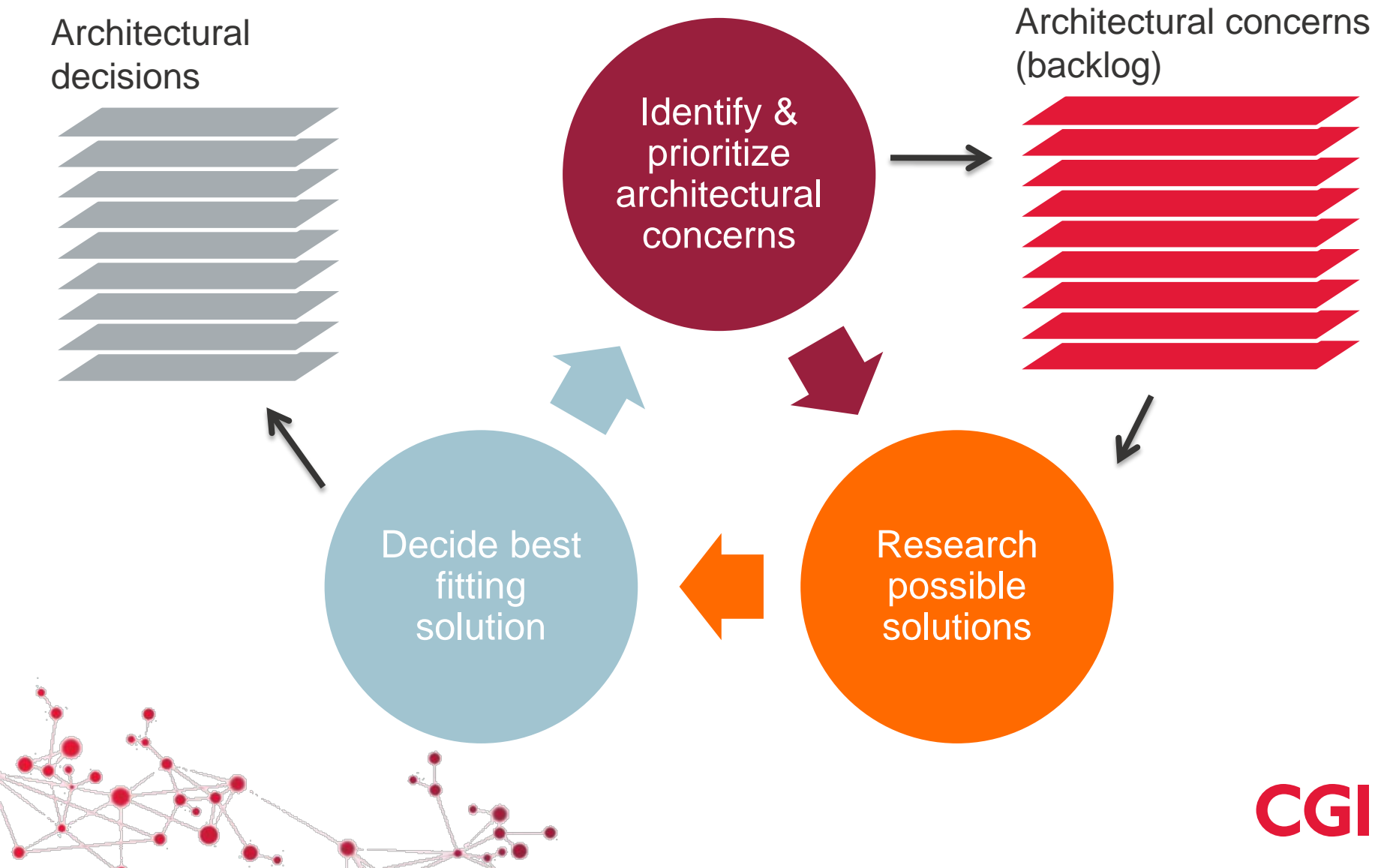
- “levels of abstraction”
- “components and connectors”
- “close coupling”, “clustering criteria”, ...

**Risk and Cost:** universal terms most stakeholders can relate to

- smoother stakeholder/architect communication
- relatively objective measure to explain priorities
- increase business managers' awareness of value of architecture



# The Architecting Workflow: Architectural Requirements Prioritization



# Architectural Requirements Prioritization

## Input

Consider more than formal technical requirements!

Primary **business drivers** of the client

Quality Attributes, sometimes captured in **NFRs**

System **Lifecycle** Constraints

Constraints of the **development organization**

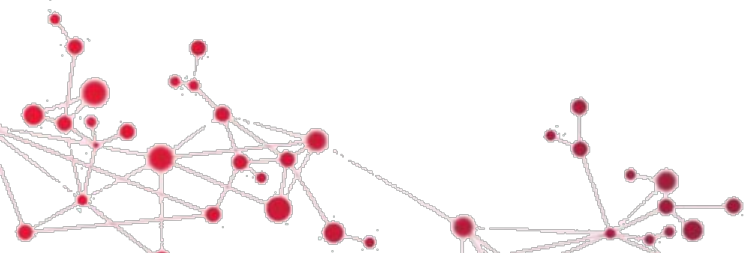
**Commercial** considerations

**Cost** constraints

**Contractual** considerations

Current technical environment

**Architectural Guidance** (mandatory or not)



# Architectural Requirements Prioritization

## Activity: Identify Architectural Requirements

When are requirements architectural? (all related to cost and risk)

### Hard or costly to realize

- usually systemic, with broad impact across the solution

### Uncertainty of fulfillment

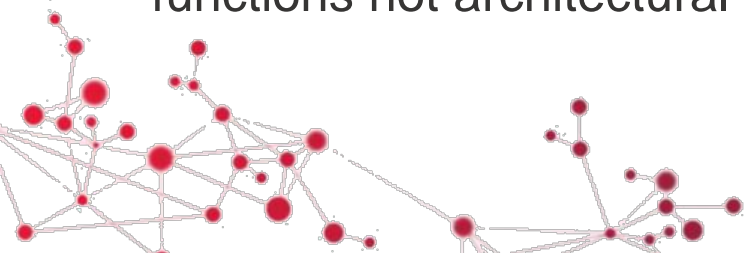
- no previous experiences or evidence of feasibility

### Critical to stakeholders

- failing to fulfill would make solution worthless to e.g. end-users
- often revealed in stakeholder workshops

### Bulk functionality

- functions not architectural by themselves but by their volume





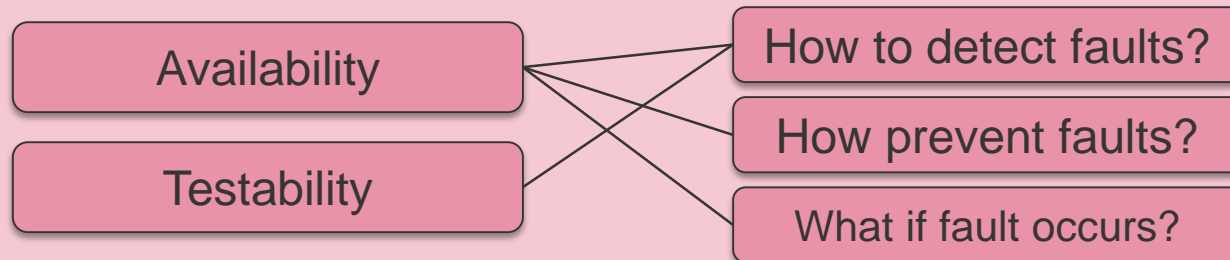
# Architectural Requirements Prioritization

## Activity: Identify Architectural Concerns

Architectural Requirements lead to Architectural Concerns



Example



Architectural Concerns can usually be expressed as question:

- what is the best OS platform to host this application on?
- which workflow engine should we use in this system?
- should we have two geographically separated data centers?
- how can we achieve the multi-language requirement?

# Architectural Requirements Prioritization

## Activity: Prioritize Architectural Requirements and Concerns

### Prioritize Architectural Concerns

- by Risk and Cost (for *all* stakeholders)
- to determine which to address first

### Focus on max. 5 or 6 simultaneously

- when these are addressed, the rest will shift anyway

### Avoid postponing hard questions

- if it's hard to deal with, put it on top of list
- fight temptation to start on easy ones (“searching under the lamplight”)

### Re-prioritize often

- concerns drop off after being addressed by architectural decisions
- criticality may drop when more info available
- new concerns triggered by architectural decisions



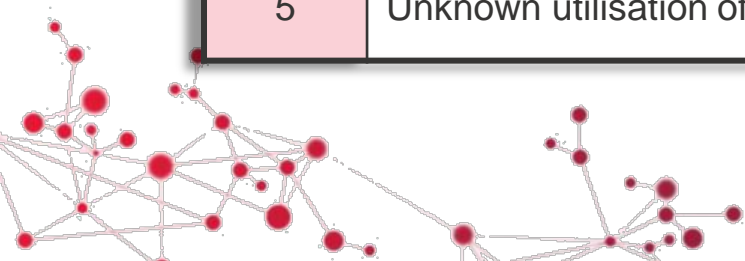
# Architectural Requirements Prioritization

## Activity: Prioritize Architectural Requirements and Concerns

Architectural Significance in terms of Risk and Cost is the **key to prioritizing backlog** of architectural concerns

- objective measure  $AS(C) = Cost(C) + Risk(C)$
- stated in business terms

Rank	Concern	Cost	Risk
1	Instant Authorization revoke	\$\$\$\$	50% \$\$
2	Non-standard UI elements	\$\$\$\$	10% \$\$
3	Performance Criteria	\$\$	10% \$\$\$\$
4	New version of Websphere	\$	50% \$\$
5	Unknown utilisation of web services	\$	5% \$\$\$



# Architectural Requirements Prioritization

## Practice Summary

### Objectives

Determine architecturally significant Requirements and Concerns  
Prioritize requirements and concerns

### Approach

Prioritize by risk and cost  
Focus on top 5/6 concerns  
Re-prioritize often  
Know when to stop

### Roles

Stakeholder  
Solution Architect

### Input

Requirements from stakeholders



### Activities

Identify Architectural Requirements  
Describe Architectural Requirements  
Identify Architectural Concerns  
Prioritize Arch Reqs and Concerns



### Output

Architectural Concerns  
Architectural Requirements

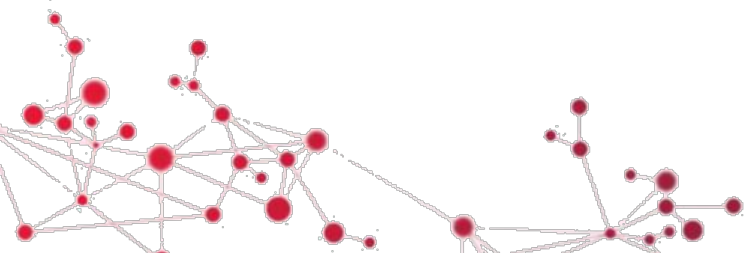
# Architectural Requirements Prioritization

## Exercise

A Solution Architect works with key stakeholders to identify and prioritize the key Architectural Requirements and Concerns

Exercise (in groups of 3):

1. Choose one student and his/her current project as case study
2. The chosen student plays the role of Solution Architect, the others are interviewers eliciting key requirements & scenarios
3. The Solution Architect presents the case (5 minutes): context and key client requirement
4. In a 10 minute discussion, identify the 2 architectural requirements with the highest impact in terms of cost and risk
5. Present the risk and cost impact of the most significant requirement to the plenary group





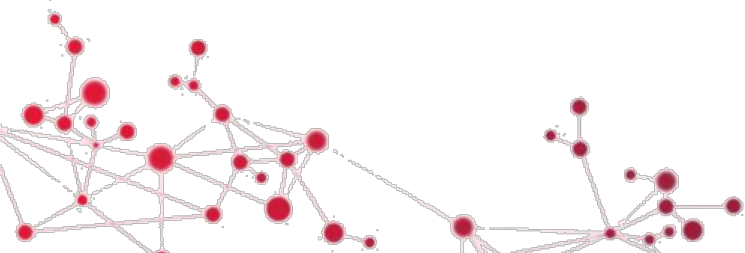
# Plenary feedback

When was cost or risk hard to estimate?

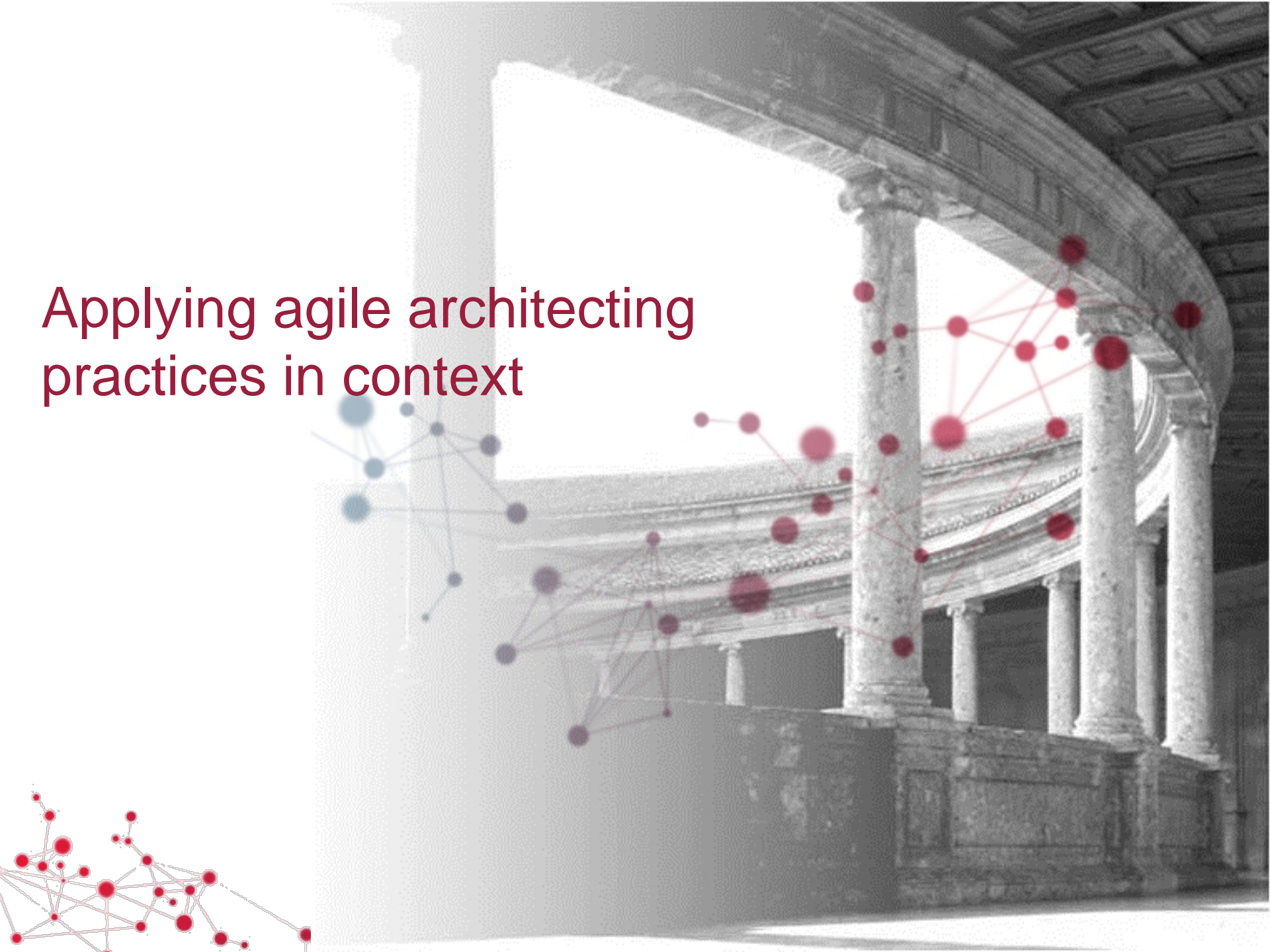
How did prioritizing concerns by risk and cost work out?

Would you be able to justify your prioritization to management?

Will you be able to apply this in your daily work?

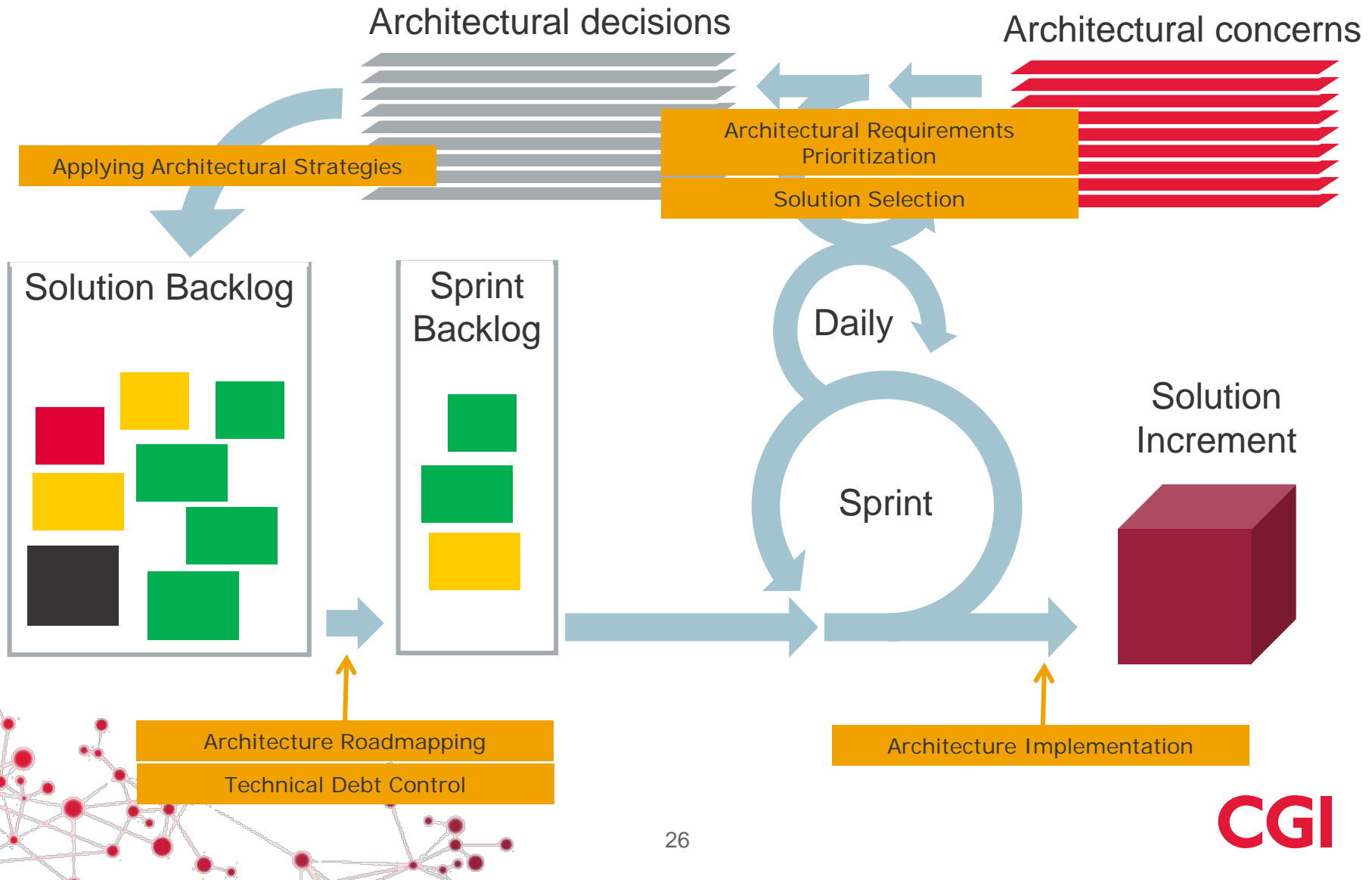


# Applying agile architecting practices in context



# Applying RCDA practices

## SCRUM

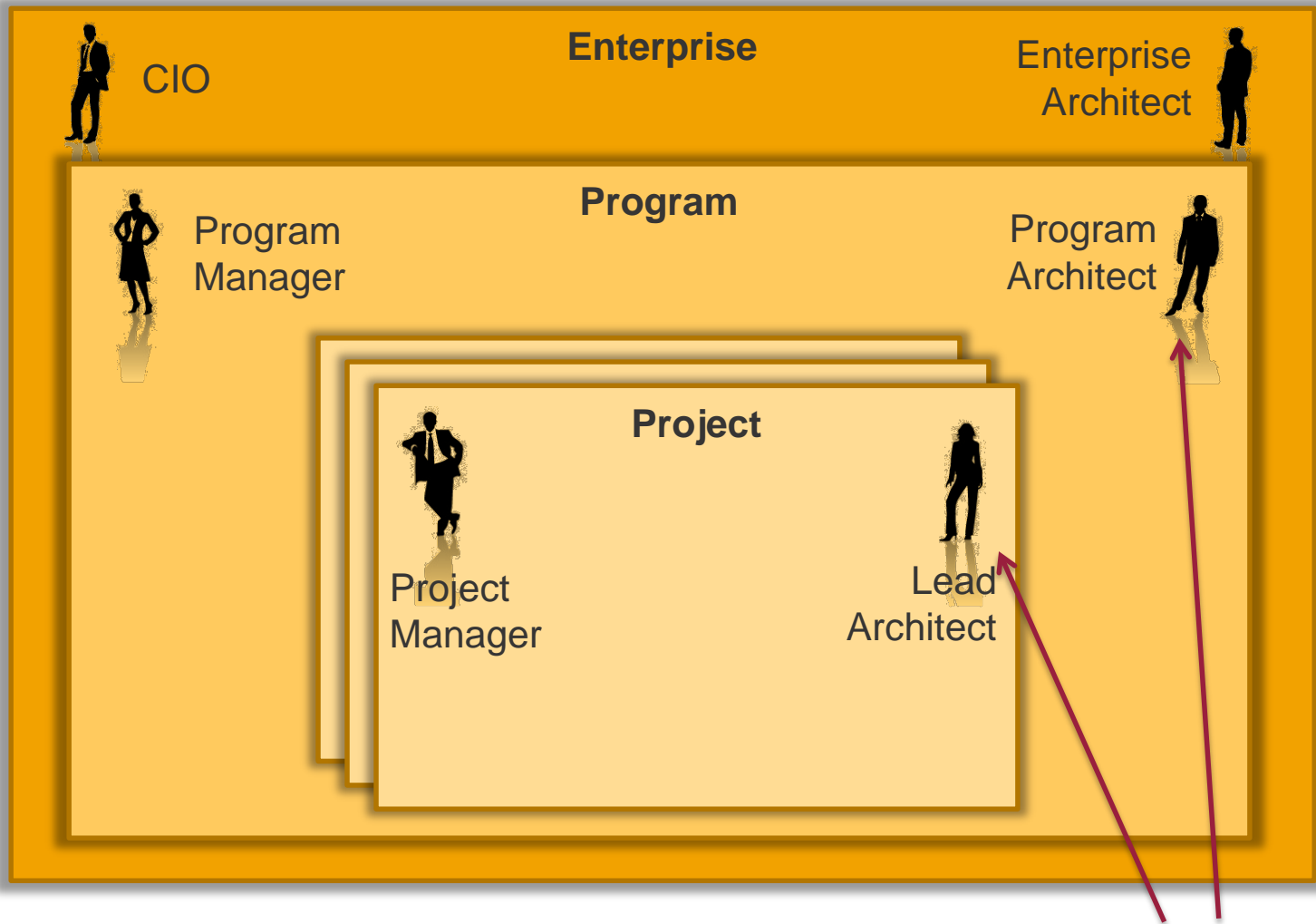


# Questions or Comments?



Spare slides follow

# Scope of Solution- vs Enterprise Architecture




Solution Architect Roles



# Architecture versus Design

What is the difference between an architect and a designer?


## Architecture



Fundamental properties  
Define guidelines  
Cross-cutting concerns  
High impact (risk, cost)  
Business stakeholders  
Manage uncertainty

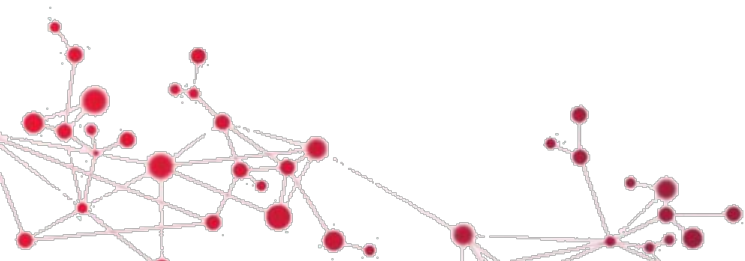
Conceptual integrity

## Design



All properties  
Use guidelines  
Individual components  
Details  
Developers  
Avoid uncertainty

Completeness



# Timing of architectural decisions

Certainty of correct architectural decision depends on knowledge:

- relative cost of the alternative solutions
- value and impact on the business
- delivery times

*All architectural decisions are based on incomplete information  
(and the highest impact decisions are taken while the least factual knowledge is available)*

Timing architectural decision is balancing **risk**, **cost** and **delivery time**:

- too little information → risk of not meeting key requirements
- waiting too long → project delays, wasted resources

Key skills of Solution Architect:

- timing of architectural decisions
- making decisions based on incomplete information
- dealing with the resulting risks



# RCDA Practitioner Course

- Interactive, classroom-based three-day training course
- Presentations, discussions and exercises
- Learn to apply good solution architecture practices in everyday work
- 5 half-day classroom sessions, plus an extensive group exercise
- RCDA teachers are experienced practicing architects

## RCDA Practitioner Course Program

### Module 1 Introduction to Solution Architecture

The Solution Architect - The Stakeholder - Architecture in CGI - Risk- and Cost Driven Architecture - Key Concepts

### Module 2 Creating a Solution Architecture

Architecture Requirements Prioritisation - Solution Selection - Applying Architectural Strategies

### Module 3 Delivering the Architecture

Architecture Documentation - Solution Costing - Architecture Evaluation - Architecture Implementation - Architecture Maintenance - Dealing with Non-Functional Requirements

### Exercise: Applying RCDA

### Module 4 Applying RCDA

Core Process - Waterfall Project - RUP Software Development - Agile Development - Bid - Blended Delivery - Enterprise to Solution Architecture

### Module 5 Supporting Practices

Stakeholder Workshop - Requirements Convergence Plan - Architecture Roadmapping - Documenting Architectural Decisions - Independent Architecture Assessment - Architectural Prototyping - Supplier Evaluation - Technical Debt Control



# The Role of Risk

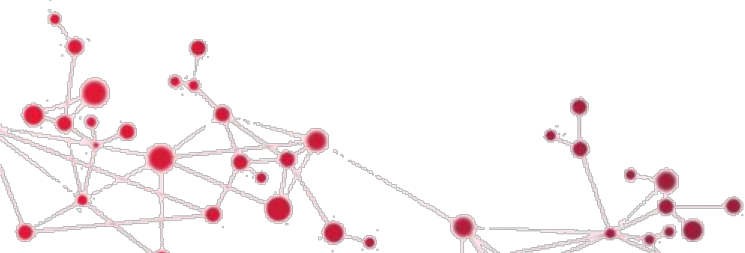
## Risk: something that may go wrong

- most directly related to Project and Solution
- impact usually measured in terms of cost
  - other impacts exist: delivery time, client satisfaction

$$\text{Risk} = \text{PerceivedProbabilityOfFailure} \times \text{PerceivedImpactOfFailure}$$

Stakeholders have different interests in risks:

- difference of scope of their stake
  - project manager: risks to project success
  - operational stakeholders: after-delivery



# The Role of Cost

Solution Architect concerned with two types of cost:

- Total Cost of Ownership (TCO) → Solution
- Project Costs → Project

Stakeholders have different interests in cost:

- difference of scope of their stake
  - project manager: project costs
  - operational stakeholders, business owner: TCO

Make sure you know which costs to optimise for!

- unclarity will lead to conflicts between architect and stakeholders

