



# Lean and Mean Architecting with RCDA

Eltjo R. Poort  
SATURN 2013, Minneapolis

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# Eltjo Poort

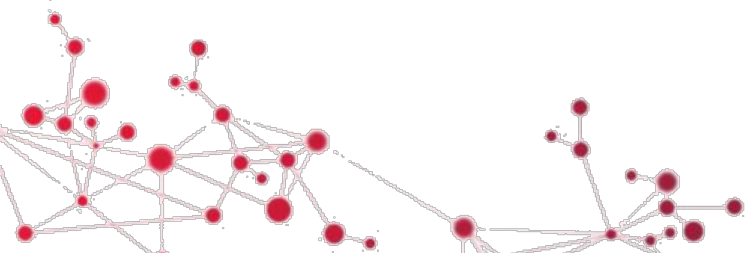
CGI NL Lead Expert Architecture

- Reviewing Bids & Projects
- Standardising & Improving Architecture Practice in CGI NL

GGI Architecture Community of Practice lead

Researcher

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



# Back to Basics in Software Methodologies

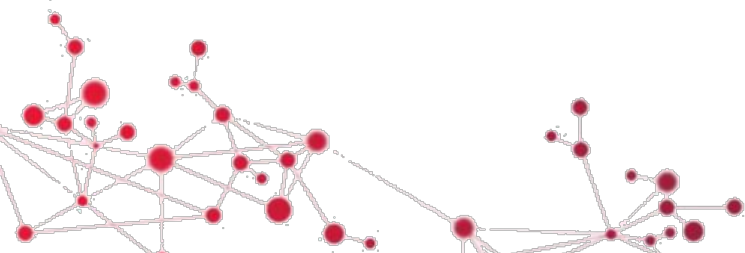
*...a process...that include[s] a kernel of widely-agreed elements, extensible for specific uses.*

[SEMAT initiative, 2010]

*Maybe we should try “lean and mean” software process models, rather than making them “richer.”....start from what people do ... and not from what we think a priori they should be doing.*

[Kruchten, 2011]

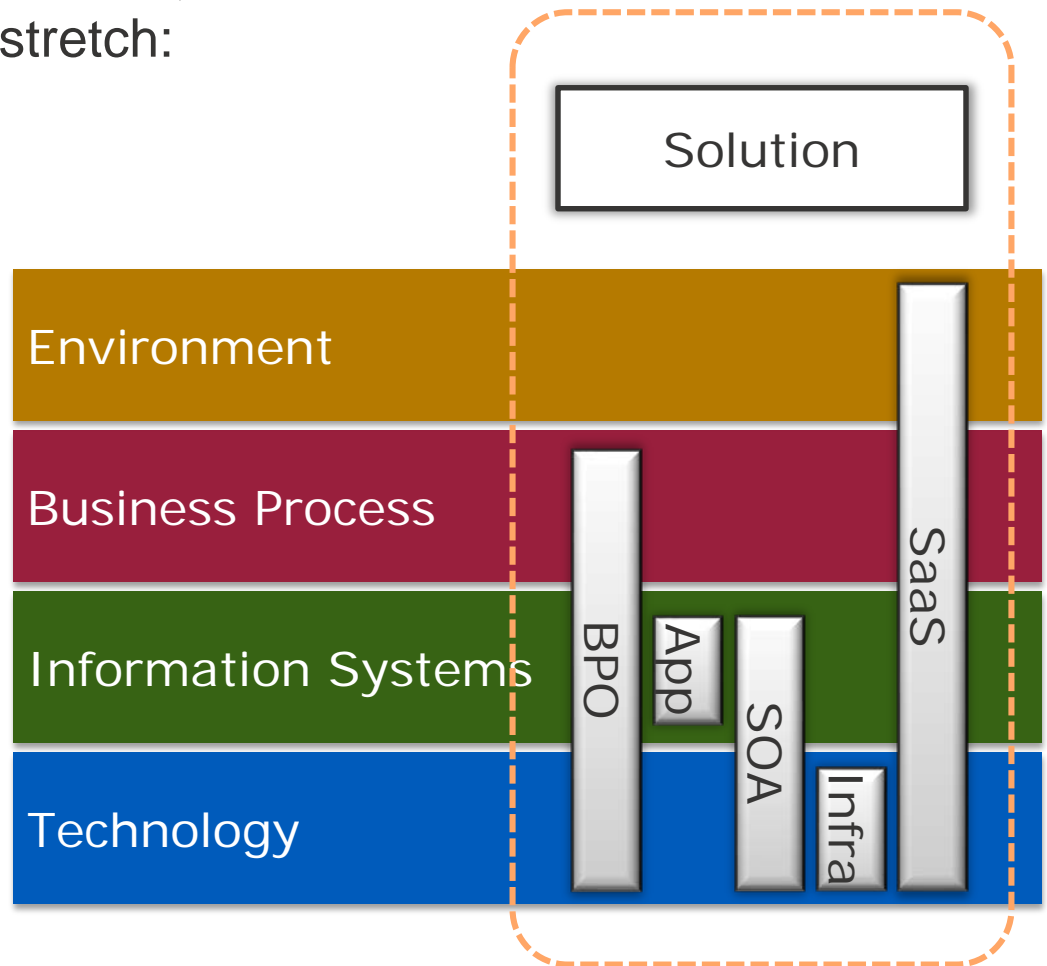
These calls resonate with the way Logica/CGI has been improving Solution Architecting practices since 2007.



# Why *Solution* Architecture?

For some of the things we architect,  
“Software” Architecture is a stretch:

- software application
- software as a service
- embedded system
- system of systems
- systems integration
- BPO solution
- full service solution
- full IT outsourcing
- ...



# Solution Architecture approach

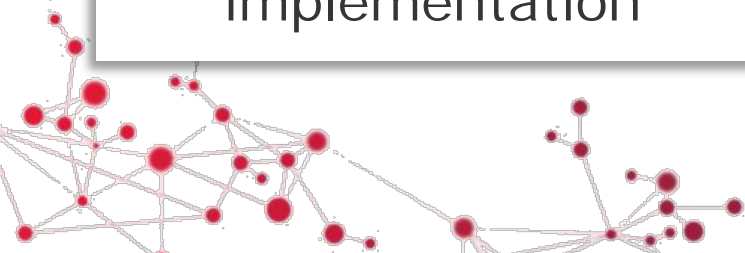
## Key characteristic

A good Solution Architecture approach **fills the gap** between:



- Enterprise Architecture approaches
  - TOGAF, IAF, Zachman...
- ✓ Strong on principles & governance
- ✗ Weak on transformation & implementation

- Technical Architecture approaches
  - E.g. Software / Infra / SOA (RUP, ATAM...)
- ✓ Strong on design & implementation
- ✗ Weak on cross-technology stakeholder concerns





# Risk- and Cost Driven Architecture



# RCDA history until now

Architecture  
Community of  
Practice  
founded

- Architecting  
Process  
initiative

RCDA 1.0  
released

- Solution  
Architecture  
Practitioner  
Course (NL,  
>100 trained)

RCDA 1.2

- Major  
presentation  
improvements
- Key practice  
extension

'07

'09

'10

'11

'12

'13

Risk- and  
Cost Driven  
Architecture  
initiative  
(Group  
Technical)

- Process →  
set of  
practices

RCDA 1.1

Solution  
Architecture  
international  
training starts  
based on  
RCDA

- Group-wide  
ratification

RCDA 1.3

- RCDA as CGI  
proposition



# Basis of Risk- and Cost Driven Architecture

Extensive experience in **Solution Assurance**

- Reviewing 100s architectures in bids and projects

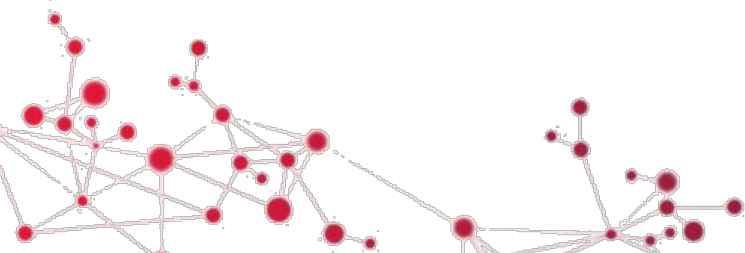
Industry Leading **Architecture visions**

- SEI, TOGAF, IBM

Research in **Architecture Knowledge Management**

- Focus on Architectural Concerns & Decisions

Feedback from CGI **Architect Community Network**



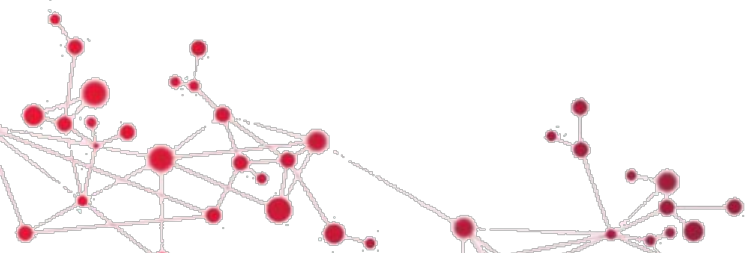


# RCDA is a Practice repository

*Practice*: a light-weight, proven way of addressing a problem

- see e.g. EssUP (Ivar Jacobson)
- more pragmatic than processes
  - easier to maintain
  - more fine-grained
  - more flexible
- easily applicable in any process/organisation
  - fit in existing sales/design/development processes
  - avoid need to adopt complete new process

*Practice repository*: stores practice descriptions and associated documents (templates, guidelines, checklists, examples...)



# Key Principles of RCDA

## Cost and Risks drive architecture

- highest impact on *cost and risks* of the system and its delivery
- architect should be an expert on costing and risk mitigation

## Architecture should be minimal

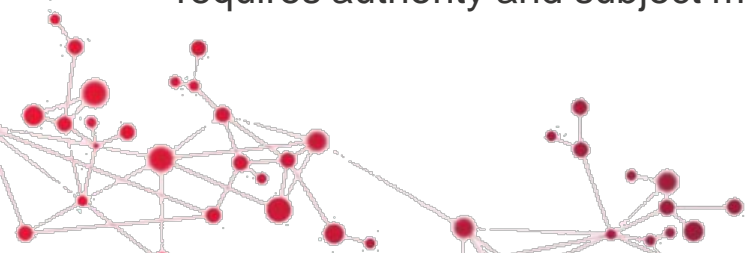
- to keep overview of the whole system
- Solution Architect should limit to decisions with critical impact
- leave a maximum of design space for developers

## Architecture as both Blueprint and Decisions

- decisions leading to architecture and the underlying rationale are essential

## Solution Architect as Decision Maker

- critical architectural decisions are made by *one person* with overview of whole system
- requires authority and subject matter skills and knowledge



# 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**.

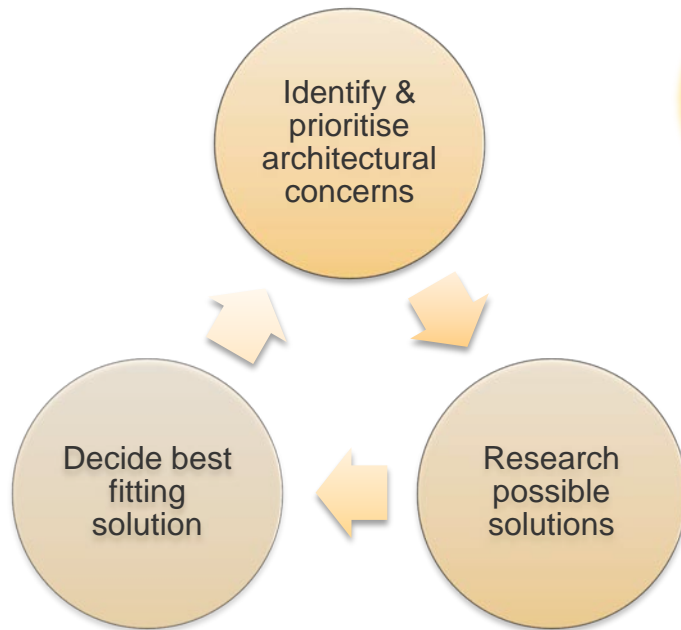
Important  $\leftrightarrow$  **high risk and cost**  $\leftrightarrow$  architectural significance





# The Architect's Daily Job

## Architecting Microcycle



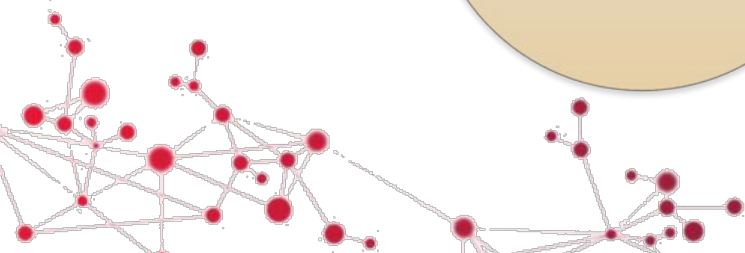
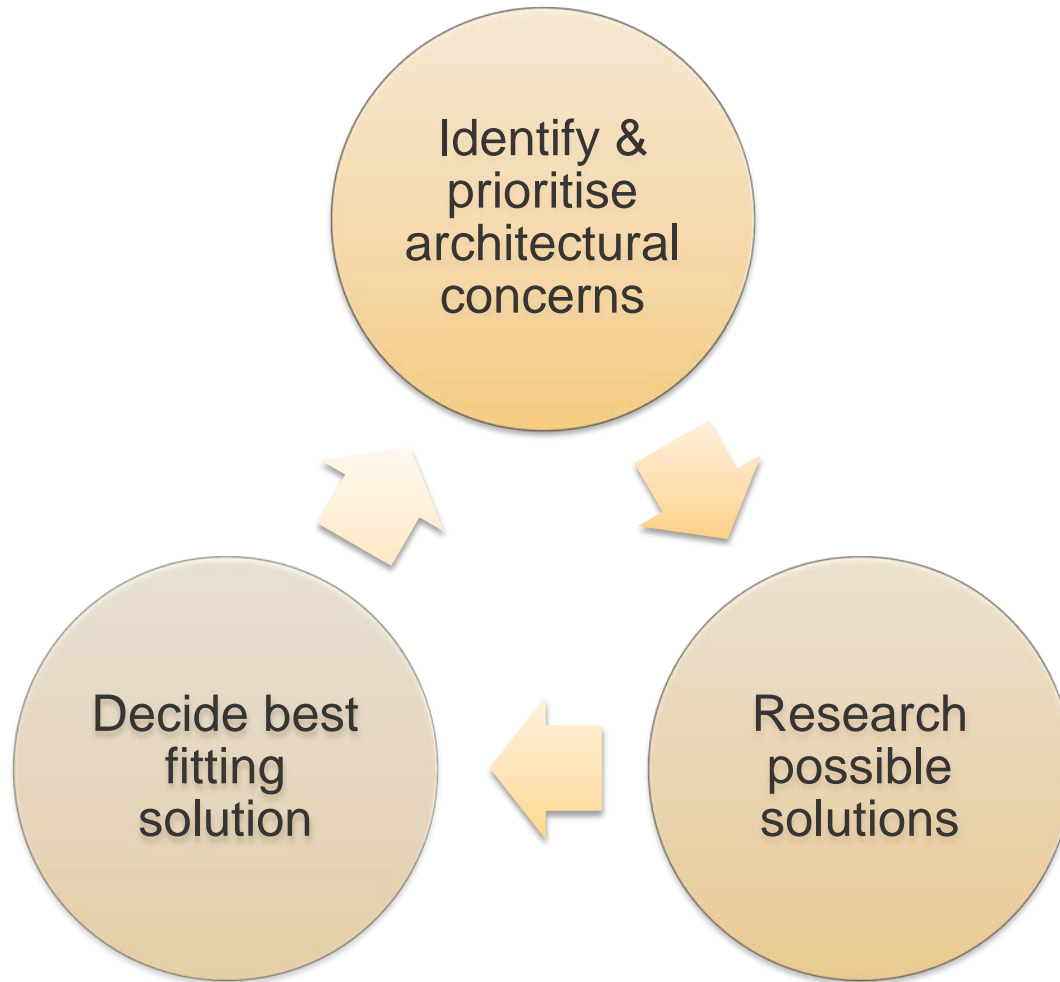
- What problems should I work on?
- What are my options?
- I'll pick this one



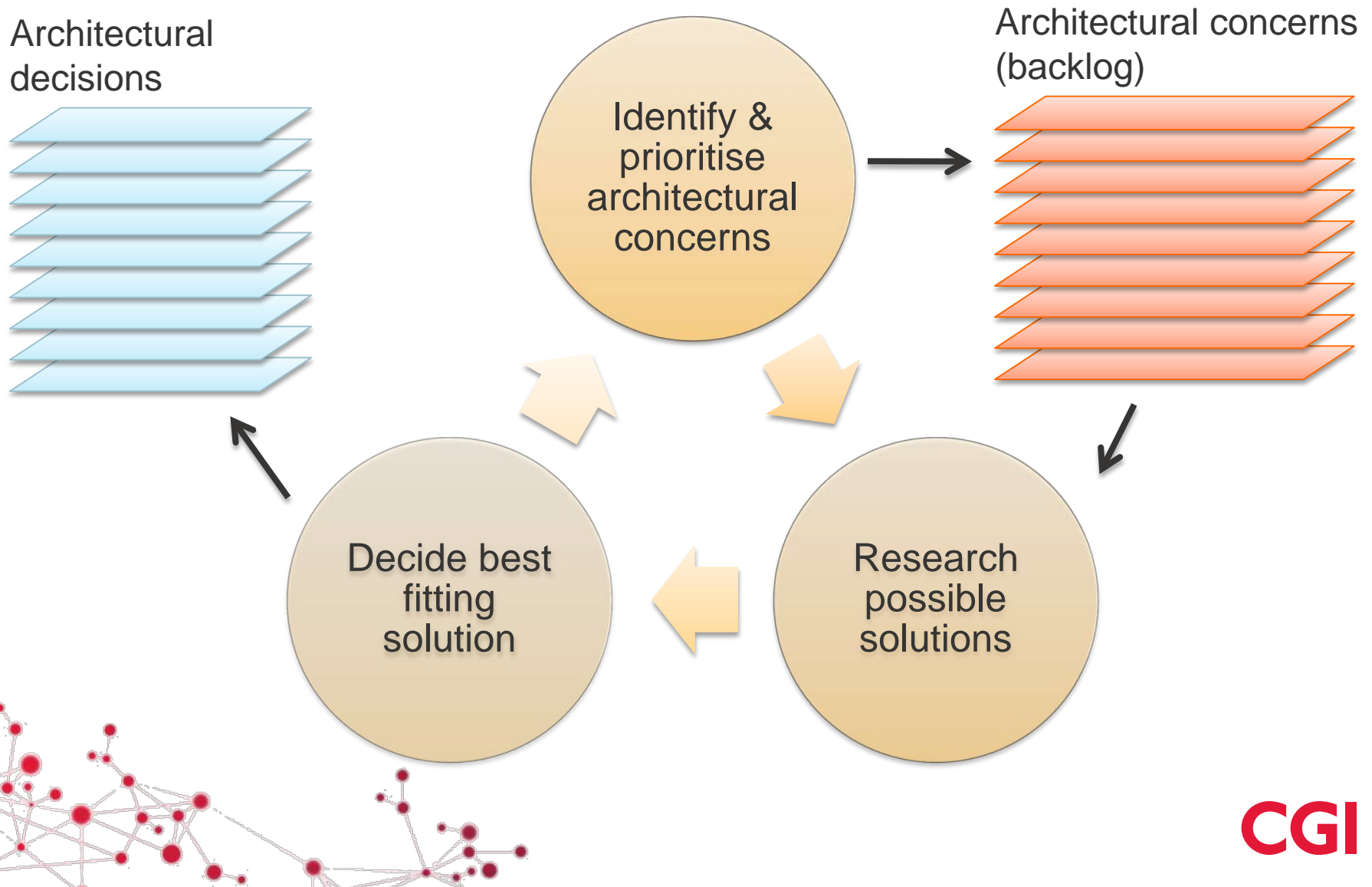
Solution Architect



# The Architecting Microcycle



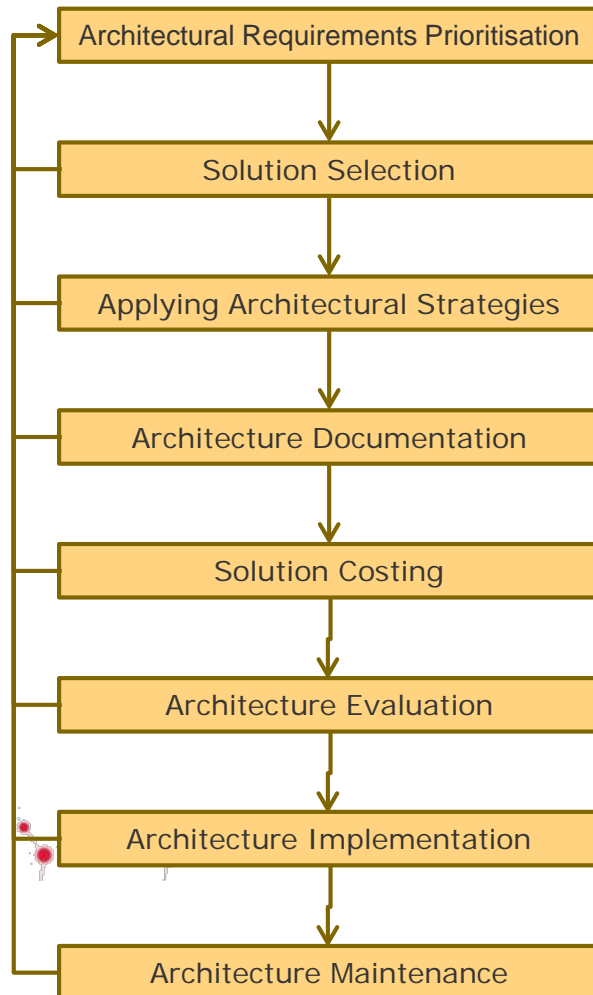
# The Architecting Workflow





# Building Up the Core Architecting Process

## Core Practices



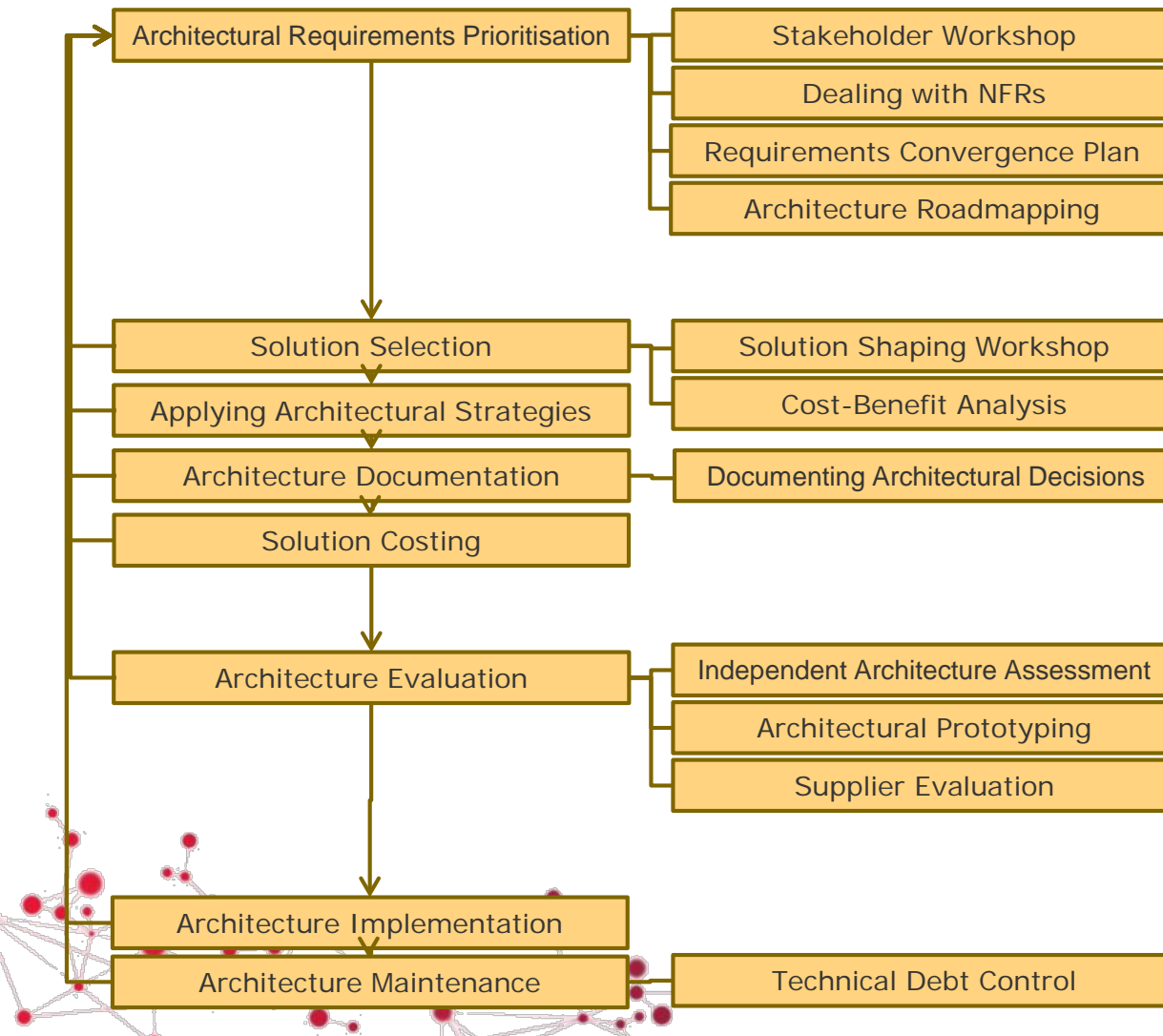
- What problems should I work on?
- What are my options?
- I'll pick this one
- Write down what I want
- What is this going to cost?
- Is this really going to work?
- Let's do it!



# Adding Supporting Practices

## Core Practices

## Supporting Practices



# RCDA Practice Sets and Lifecycles

## Core Practices

## Supporting Practices

## Lifecycles

### Requirements Analysis

Architectural Requirements Prioritisation

Stakeholder Workshop

Dealing with NFRs

Requirements Convergence Plan

Architecture Roadmapping

### Solution Shaping

Solution Selection

Solution Shaping Workshop

Applying Architectural Strategies

Cost-Benefit Analysis

Architecture Documentation

Documenting Architectural Decisions

Solution Costing

### Architecture Validation

Architecture Evaluation

Independent Architecture Assessment

Architectural Prototyping

Supplier Evaluation

### Architecture Fulfillment

Architecture Implementation

Architecture Maintenance

Technical Debt Control

RCDA Core Process

Waterfall Project

RUP Software Development

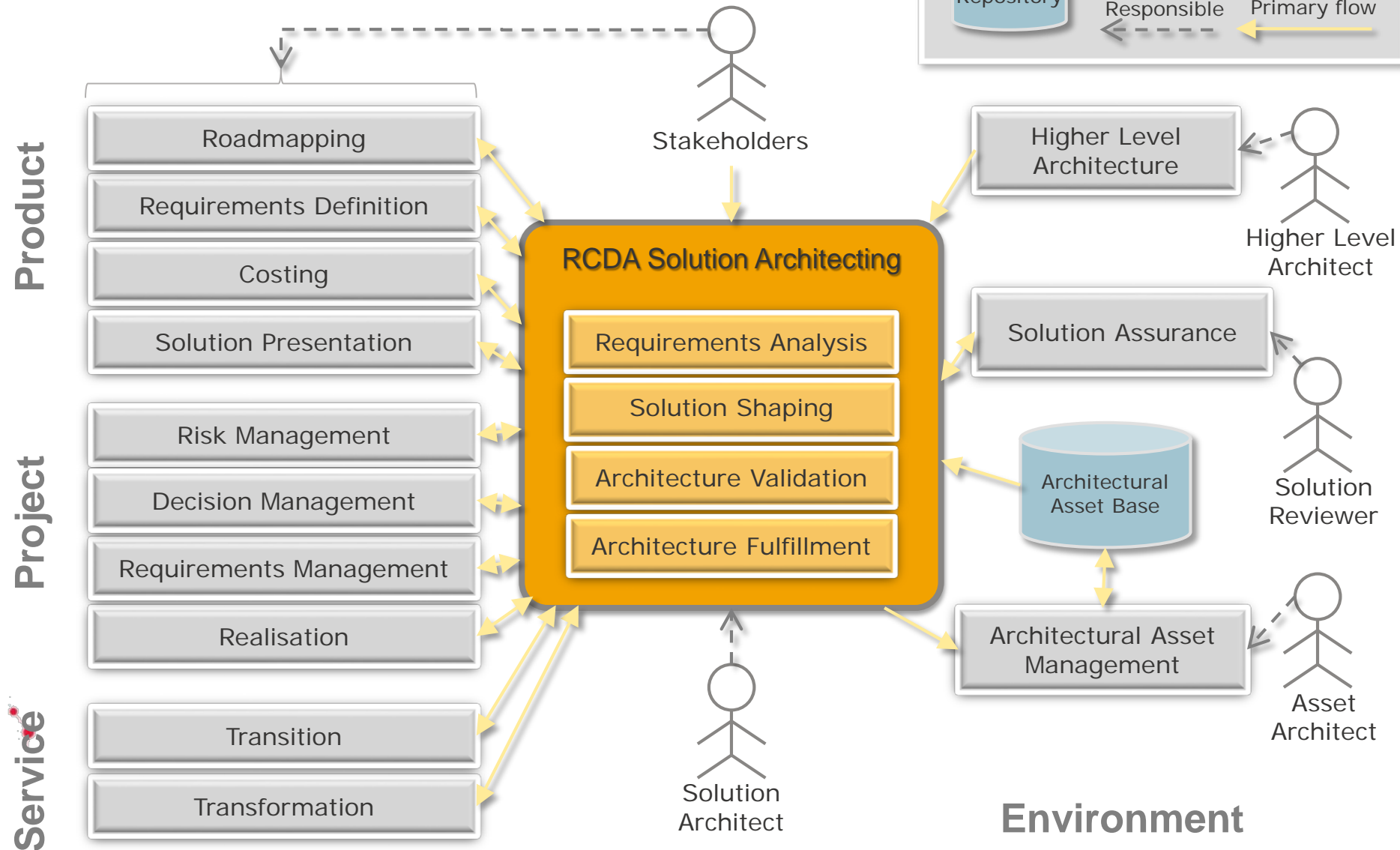
Agile Development

Bid

Blended Delivery

Enterprise to Solution

# RCDA in Context

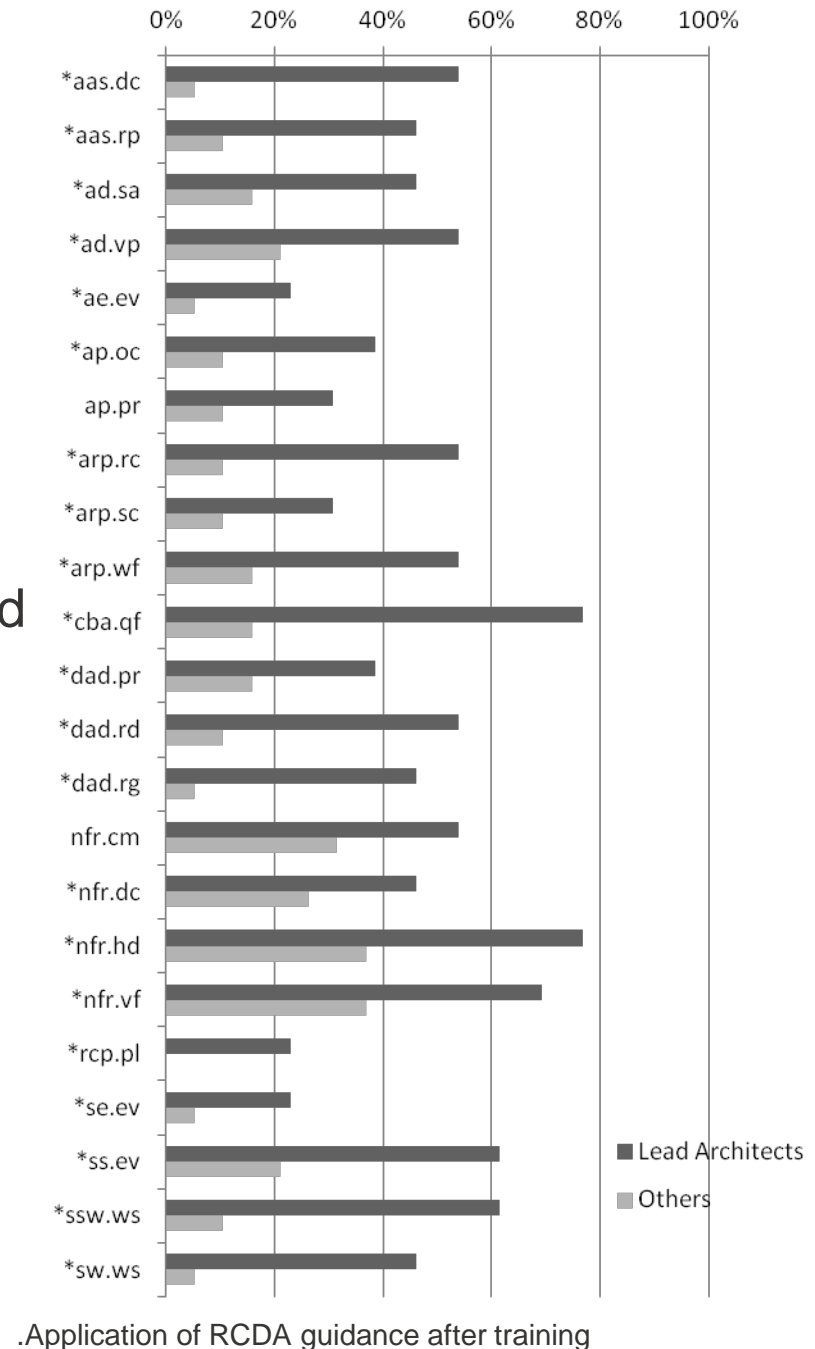


# RCDA Survey Results

## October 2011

- 60% of architects report increased effectiveness after RCDA training
- 77% of **lead architects** report increased effectiveness

RCDA: Solution Architecting as a Risk- and Cost Management Discipline,  
Eltjo R. Poort and Hans van Vliet, Journal of Systems and Software (2012)

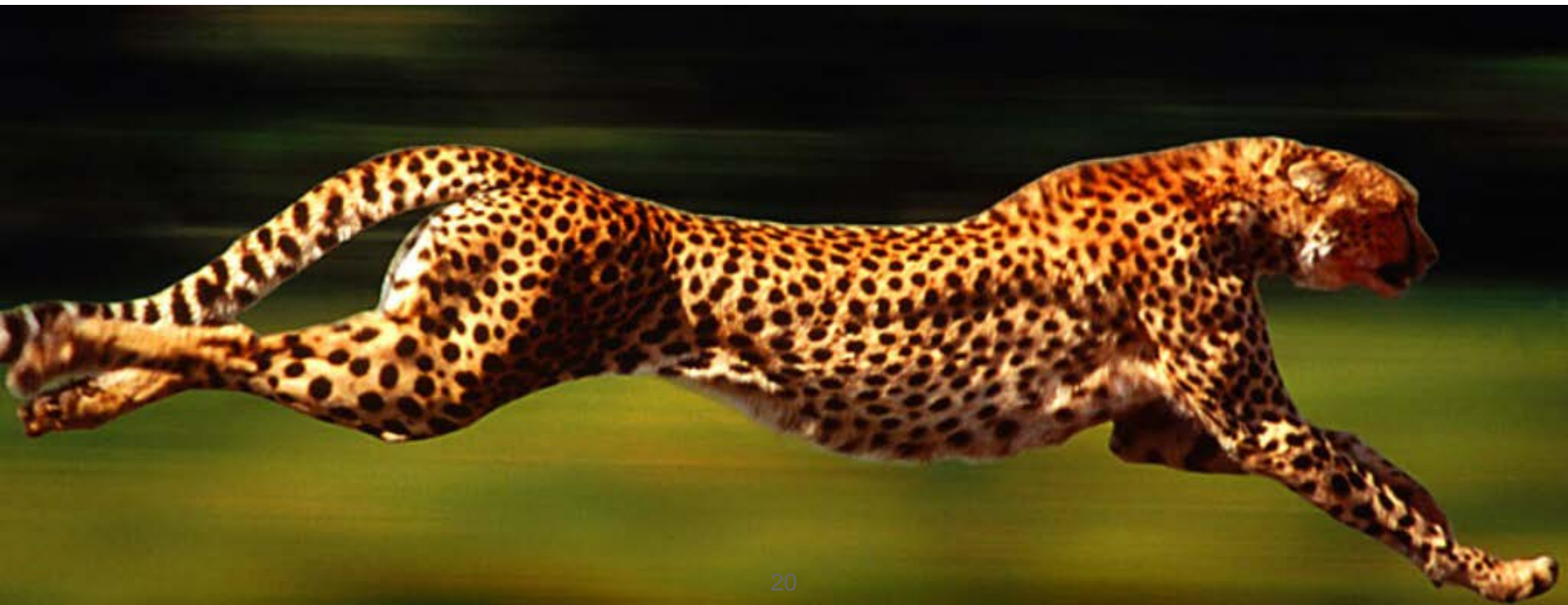


# RCDA is Lean, Mean and Agile

Practices (core and extensions) make RCDA **Lean**

Risk and Cost focus make RCDA **Mean**

Architectural Decision Microcycle makes RCDA **Agile**







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# Solution example: Mobile Application

Athletes use app to register their location for Anti-Doping Authority.  
Used by 58% of Dutch athletes at 2012 Olympics.

- App on Android, Apple, Blackberry.
- Server platform & back-office software.
- Maintenance & support.



# Solution example: Software Application (\$1.5M)

## State Government Election Count System

### Delivery Scope:

- Architect & design software & hardware platform
- Development (Microsoft .net)
- Installation and configuration on client's hardware
- Warranty & support

Ballot entry application

**Ballot entry and comparison**

District: ABCDEFGHIJ Area: ABCDEFGHIJ Ward: ABCDEFGHIJ Polling place: ABCDEFGHIJ

Entry round: 1 Entry round 1: Terminal 3 Entry round 2:

**Batch details** Hide «  
Batch ID: 12345

**Ballot details**  
Ballot number: 6 of expected 100

**Above the line** ☒ Set ATL as cursor default

| No. | 1 <sup>st</sup> Round | 2 <sup>nd</sup> Round |
|-----|-----------------------|-----------------------|
| 1   | •                     |                       |
| 2   | •                     |                       |
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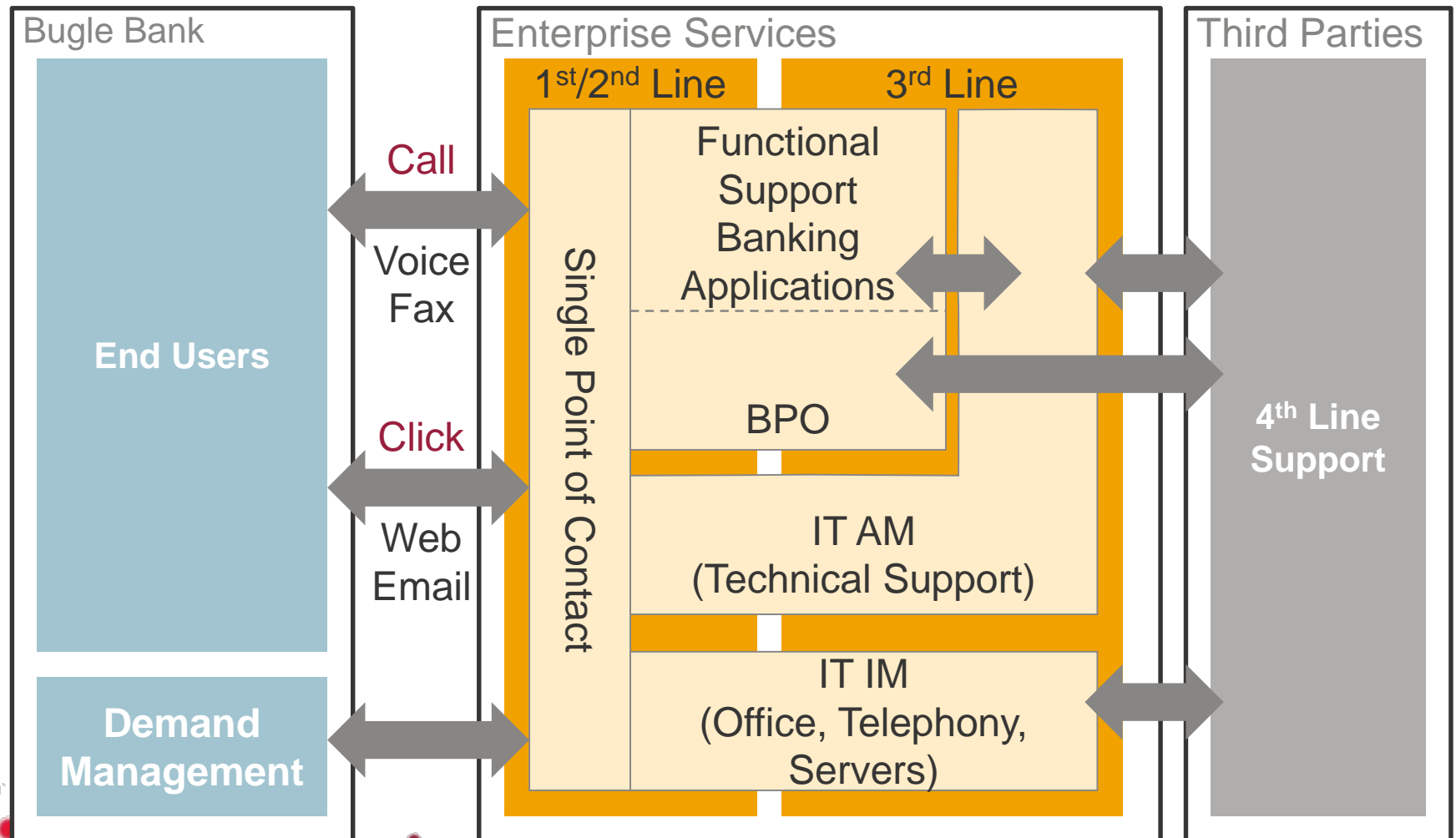
**Below the line** ☐ Set BTL as cursor default

| Group ID | Candidate           | 1 <sup>st</sup> Round |
|----------|---------------------|-----------------------|
| A        | Kevin Rudd          |                       |
| A        | John Howard         |                       |
| A        | Paul Keating        |                       |
| A        | Robert Hawke        |                       |
| A        | Malcolm Fraser      |                       |
| B        | Sir William McMahon |                       |
| B        | John Gorton         |                       |
| B        | Sir John McEwen     |                       |
| B        | Harold Holt         |                       |
| B        | Gordon Menzies      |                       |
| C        | Francis Forde       |                       |
| C        | John Curtin         |                       |
| C        | Sir Arthur Fadden   |                       |
| C        | Sir Earle Grafton   |                       |
| C        | Joseph Lyons        |                       |
| C        | James Scullin       |                       |
| D        | William Hughes      |                       |
| D        | Andrew Fisher       |                       |
| E        | Alfred Deakin       |                       |

< Previous ballot Clear Undo Next ballot > Submit batch

# Solution example: Outsourcing (70M€, 7yr)

## Bugle Bank Full IT Outsourcing



# Architecture Lifecycle

## UP Software Development

### Inception/Elaboration phase

Dealing with NFRs

Supplementary Specification

Requirements Convergence Plan

Elaboration Phase planning

Architecture Documentation

Software Architecture Document

Architectural Requirements Prioritisation

Solution Selection

Addressing architecturally significant requirements

Applying Architectural Strategies

Architecture Evaluation

Elaboration Phase exit criteria

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### Construction/Transition phase

Architecture Roadmapping

Iteration planning

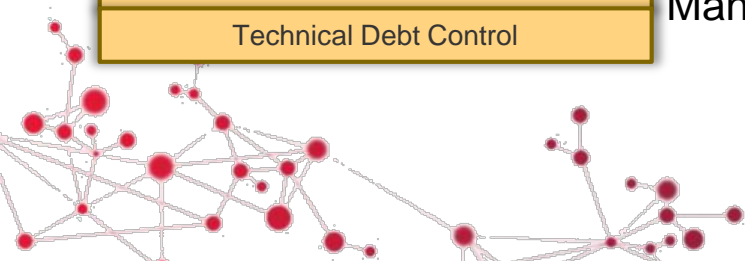
Architecture Implementation

Ensuring compliance with SAD by developers  
Coordinating integration  
Testing architectural requirements

Architecture Maintenance

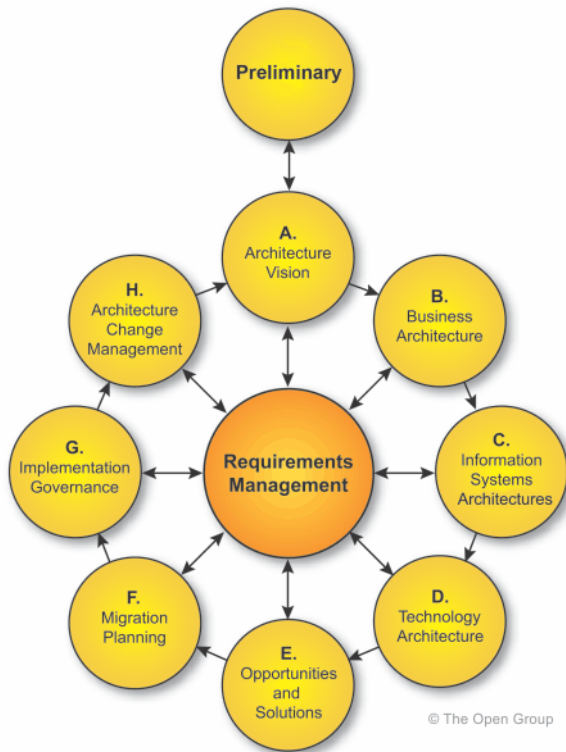
Technical Debt Control

Managing architectural change



# Architecture Lifecycle

## Enterprise Architecture to Solution Architecture



- Solution: part of transformation under EA
  - Gap from actual to target enterprise architecture
- EA → Requirements + Architectural Guidance
  - Part of Higher Level Architecture
  - Project Start Architecture (DYA)?
- EA may prescribe views
  - Business, Information Systems, Technology
- Involve Enterprise Architects as Stakeholders
  - Briefings, workshops, reviews
  - Independent solution reviewers?

