

# **JCSE Architecture Forum**

I.T. Architect?

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# Introduction



Systems Architecture is NOT NEW

# Introduction: Origins

*“conceptual structure of a computer...as seen by the programmer “*

Fred Brooks and Ken Iverson [1969]

*“Where architecture tells **what** happens, implementation tells **how** it is made to happen”*

Fred Brooks quoting Gerald Blaauw [1969]

<http://www.sei.cmu.edu/architecture/roots.html>

## Architecture is...

*“The **fundamental organization of a system**, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution.”*

ANSI/IEEE Std 1471-2000

# Introduction: Definition

- » An architecture defines the...
  - ...elements or components in a solution
  - ...behaviour of each element
  - ...relationships between these elements
  - ...structures containing these elements
  - ...quality requirements imposed on the system

More reading: [SEI - Published Software Architecture Definitions](#)

# Introduction: Definition

- » An architecture goes beyond the...
  - ... algorithms and data structures of the computation
  - ... physical implementation of the solution

More reading: [SEI - Published Software Architecture Definitions](#)

# Architects: Why do we need them?



# Why?

## (1. Non-architected architecture - Scale)

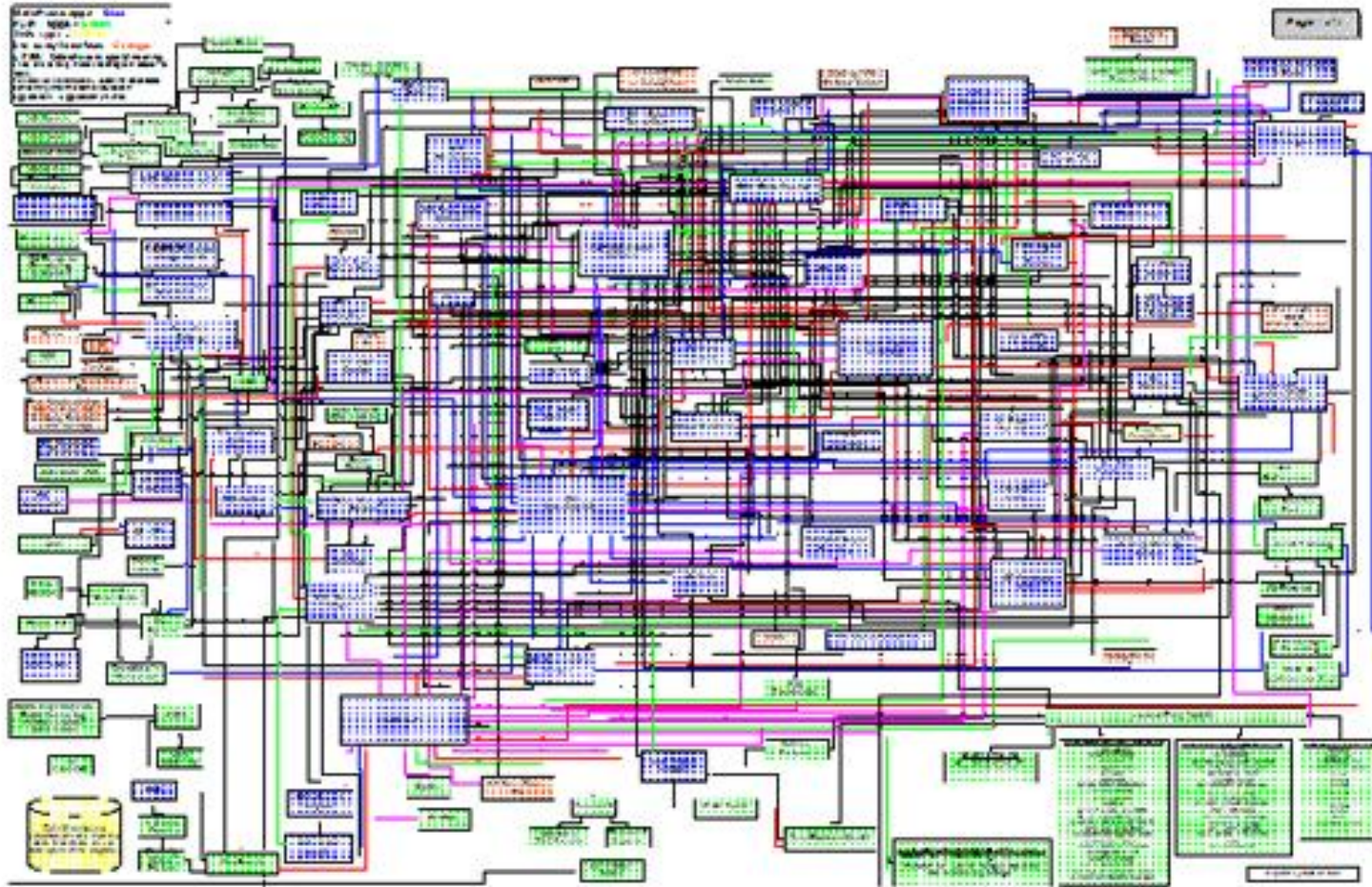


VS.



# Why?

## (1. Non-architected architecture)



**Application Diagram**

# Why?

## (1. Non-architected architecture)

**Every system has an architecture whether we like it or not...**

Systems without intentional architecture usually have some problems

# Why?

## (1. Non-architected architecture)

### » **Big ball of mud (a.k.a. Shantytown)**

A system with no recognizable structure.

### » **Spaghetti**

A system with no logical flow, where any part may be connected to any other part.

### » **House of cards**

A system where inter-component dependency is so high that making one change or fix causes many things to break.

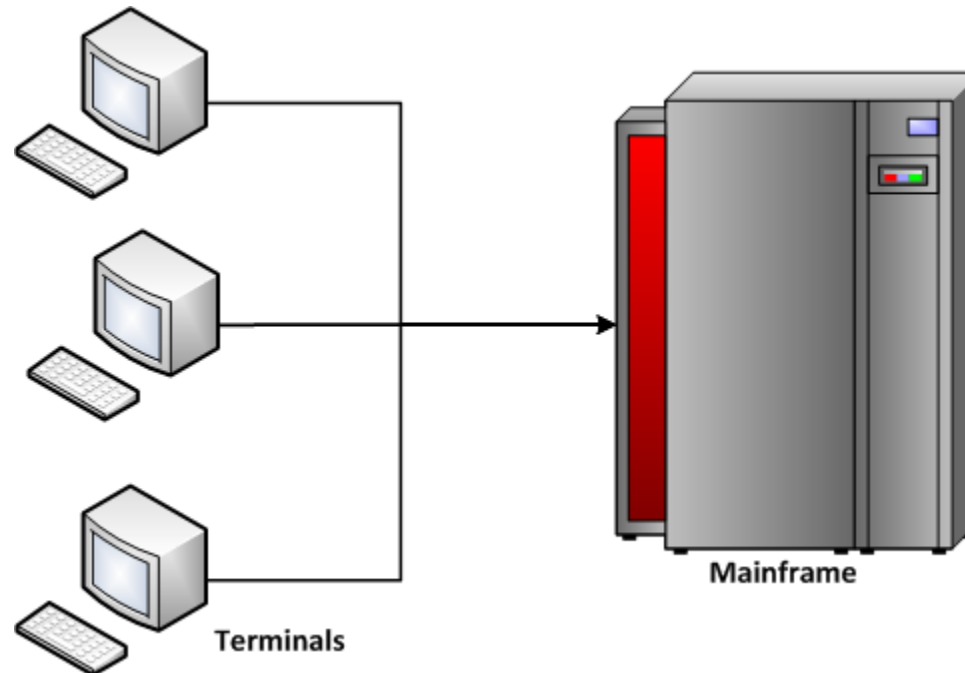
### » **Stovepipe Architecture**

A barely maintainable assemblage of ill-related components.

### » **...and many more**

# Why?

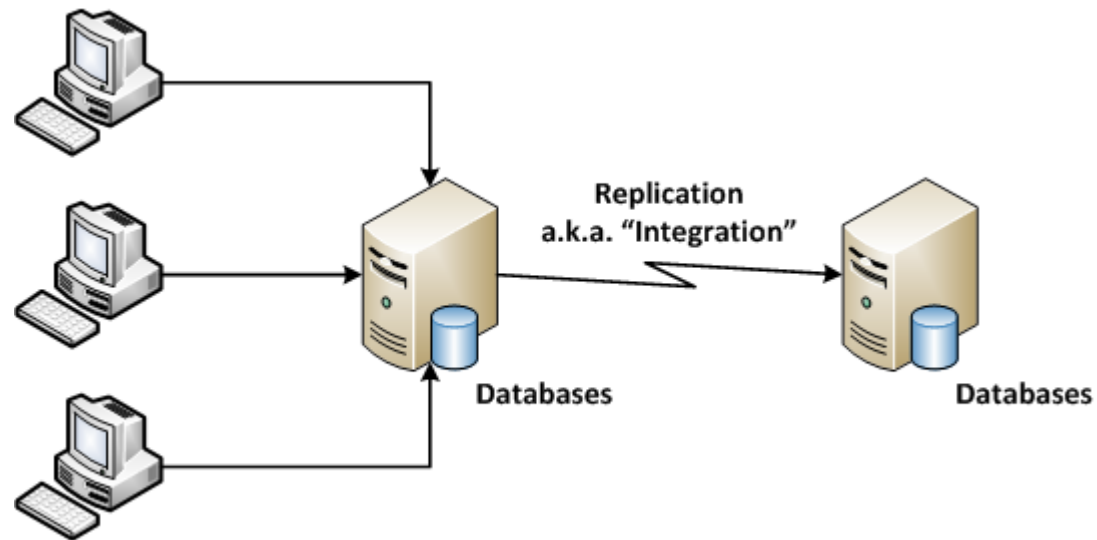
## (2. The past and the present)



## Mainframes architectures

# Why?

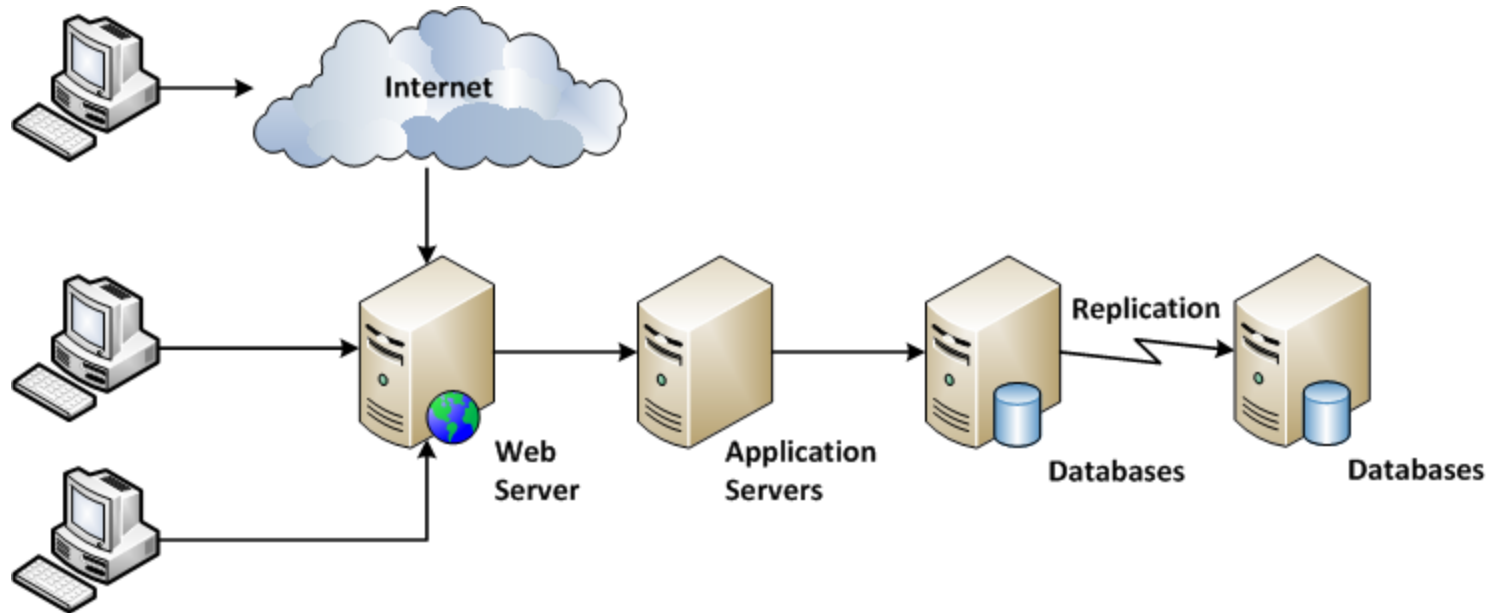
## (2. The past and the present)



## Client-Server architecture

# Why?

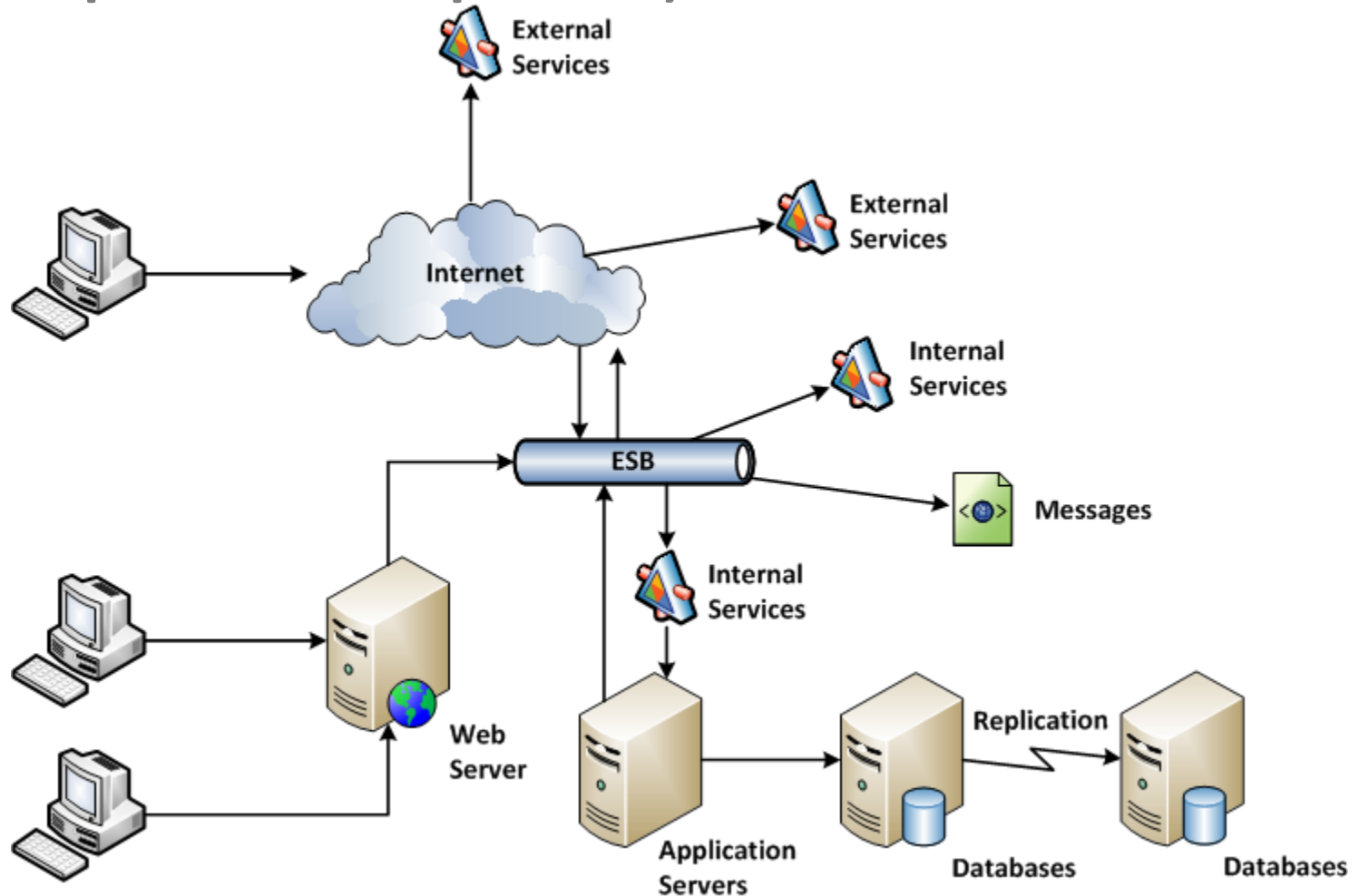
## (2. The past and the present)



**n-Tier architectures (Internet revolution)**

# Why?

## (2. The past and the present)



**Modern architectures (Service-oriented, event-driven, etc)**



**Architects: What do they do?**

# What? (Responsibilities)

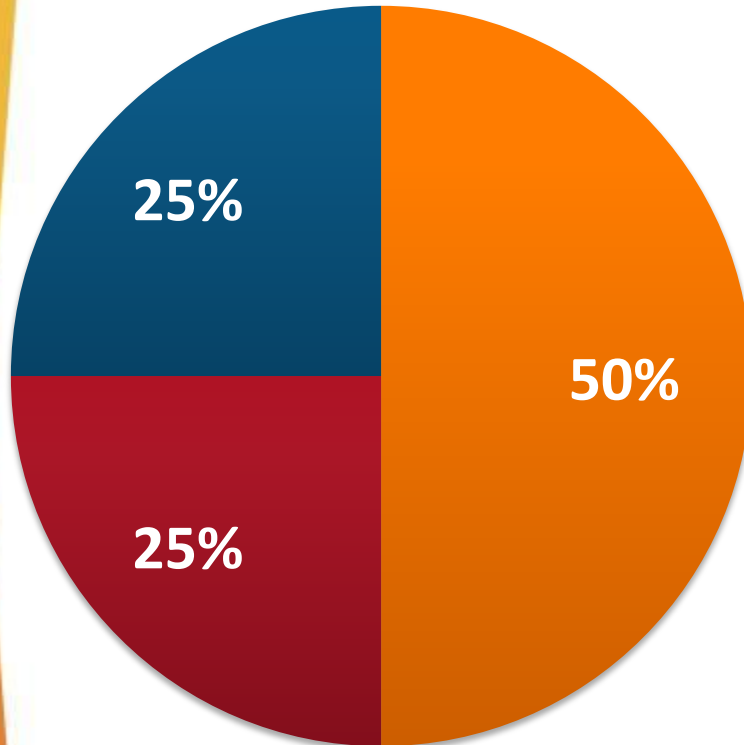
## An architect...

- » ...understands requirements
- » ...monitors and defines quality levels
- » ...evaluates solutions
- » ...defines structure and behaviour of the system
- » ...provides technical vision and leadership
- » ...governs technical implementation
- » ...works with stakeholders

[http://www.sei.cmu.edu/architecture/arch\\_duties.html](http://www.sei.cmu.edu/architecture/arch_duties.html)

# What? (Activities)

Time



## ■ Architecting (Internal)

Design, Validation, Prototyping, Documenting, etc....

## ■ Getting input (External - Inwards)

User requirements, Other architectures, Technology

## ■ Providing Information (External - Outwards)

Communicating architecture and assisting other stakeholders (including project management, testing and business analysis)

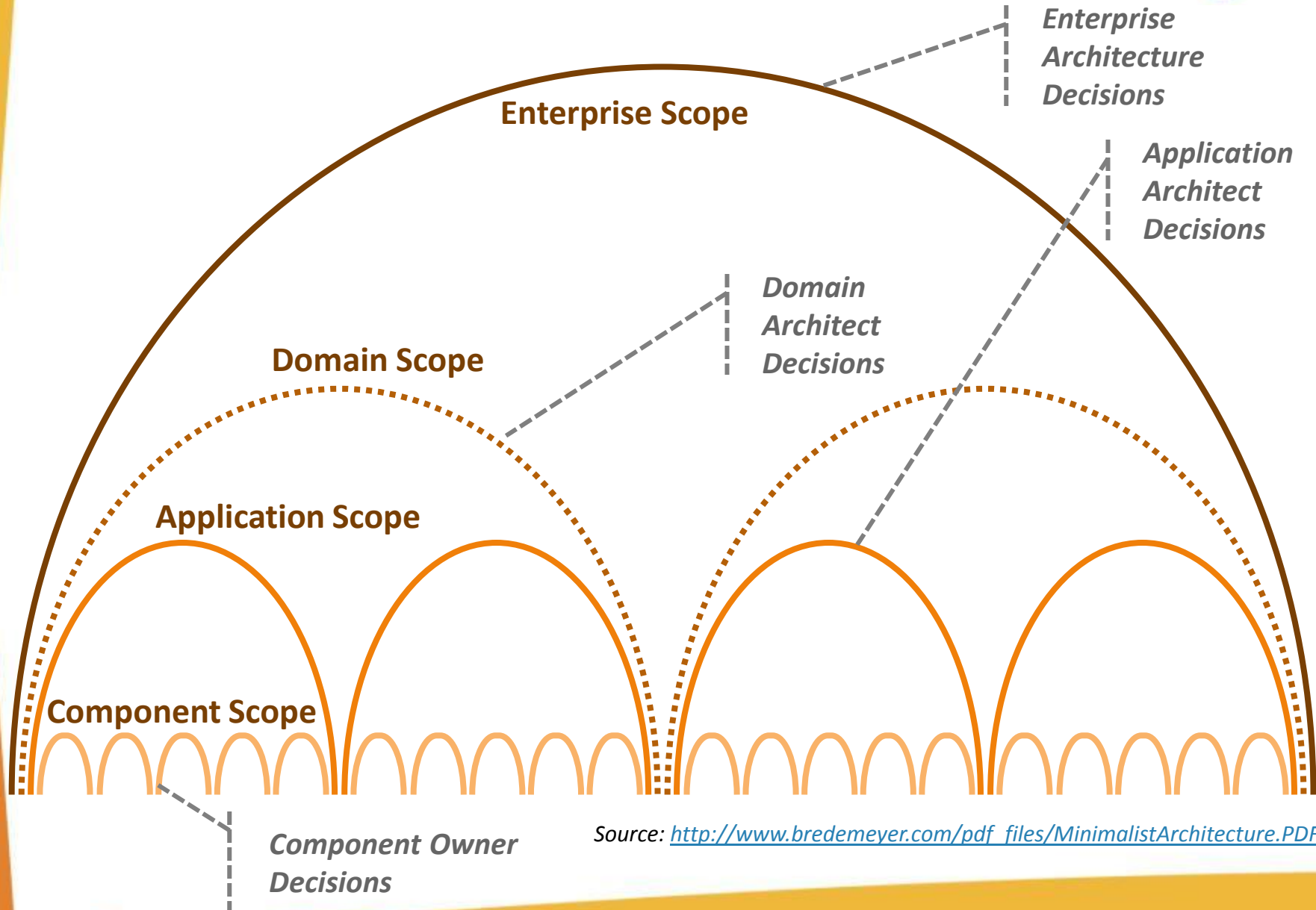
[http://www.sei.cmu.edu/architecture/what\\_architects\\_do.pdf](http://www.sei.cmu.edu/architecture/what_architects_do.pdf)

# What? (Skills)

- » Strategic, Abstract and Critical Thinkers
- » Excellent Communicators
- » Mentor and lead team members
- » Domain Knowledge
- » Technical Acumen (Specialists)
- » Broad role experience (Project Management, Business Analysis)
- » Passionate about process, best practice and **doing IT right!!**

[http://www.sei.cmu.edu/architecture/arch\\_duties.html](http://www.sei.cmu.edu/architecture/arch_duties.html)

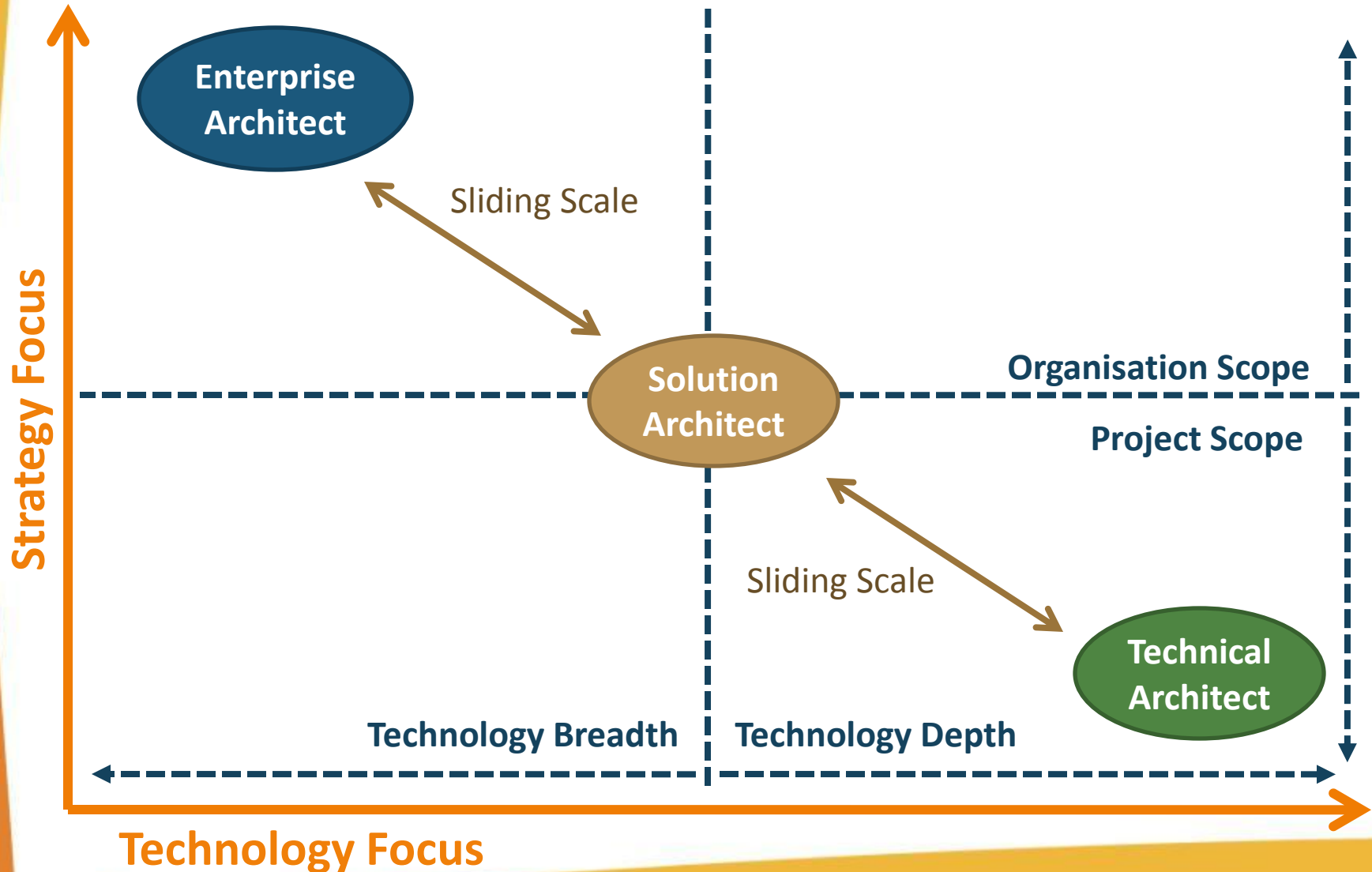
# What? (Scope)



Source: [http://www.bredemeyer.com/pdf\\_files/MinimalistArchitecture.PDF](http://www.bredemeyer.com/pdf_files/MinimalistArchitecture.PDF)

# What? (Scope)

Source: Microsoft Architecture Journal 15



# Architects: Who are they?



# Who? (Role and Experience)

## Enterprise Architect

Has done it all, seen it all, bought the t-shirts, and has the grey hair...

**Also known as:** Strategic Architect, Chief Architect or CIO (In smaller companies)

### Role:

- » Concerned with **strategic vision** of **application and services**
- » **Works cross-organizationally**, and **across architecture domains**
- » **Leads infrastructure** architects, **software** architects and **line-of-business** (LOB)
- » Plan and build the **blueprint of architecture** for the enterprise.

*Source: SEI, Microsoft Developer Network, Simon Guest, IBM Developer Works*

# Who? (Role and Experience)

## Business Architect

Business analyst, but more...

**Also known as:** Line-of-business (LOB) architect or Domain Architect

### Role:

- » **Business Division / Group Scope**
- » **Link** between the **needs of business**, architecture & implementation teams
- » **Similar to Enterprise Architect in many ways**, but the Domain architect **focuses on one area** of the business and, because of its focus, results in a more specific design.
- » Deep knowledge in the business; process modelling; requirement analysis

*Source: IASA, Microsoft Developer Network, Simon Guest*

# Who? (Role and Experience)

## Solutions Architect

(Experienced Implementer, but more...)

**Also known as:** Application Architect, Software Architect, Data Architect, Integration Architect

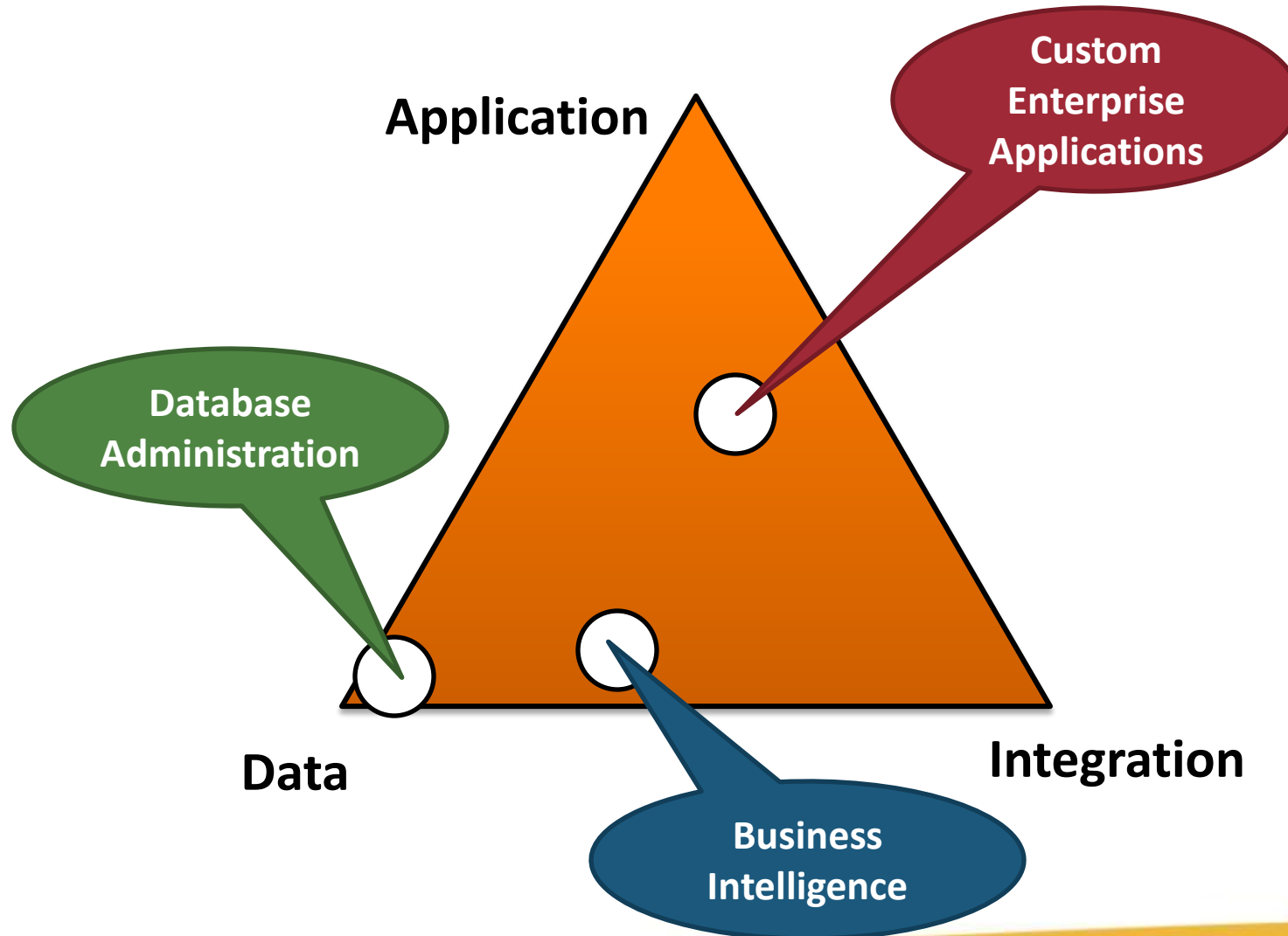
### Role:

- » **Project Scope: Manages the design of one or more applications/services** within an organization or **division**.
- » Able to help perform **strategic thinking** from a **implementation** perspective
- » Deals with **systems, boundaries, interfaces, and interactions**.
- » Explain high-level design choices; and communicate with stakeholders.

*Source: SEI, Microsoft Developer Network, Simon Guest, IBM Developer Works*

# Who? (Role and Experience)

## Solutions Architect (cont.)



# Who? (Role and Experience)

## Infrastructure Architect

(IT Pro, but more...)

**Also known as:** Technology Architect or Operations Architect

### Role:

- » **Design datacenters**
- » **Takes care of deployment and maintenance of applications and services across the organization.**
- » **Works with Solution Architect** to design for scalability, reliability, manageability, availability, performance, and security
- » **Works with Enterprise Architect** to **receive** and contributes to **strategic direction.**

# Who? (The Anti-Role)

## Ivory Towers Architect

(Does not code, cannot implement and just talks and talks and draws and talks...)

### Role:

- » Lives **isolated** from implementation in some other part of the organization (another floor or building)
- » **Comes up** after some months with a complete **architecture, out of the blue.**
- » **Too divorced from the teams** that are actually doing development
- » Just **hands** the architecture **definition** off to the implementation **team(s)**

# Who? (The Anti-Role)

## Absent Architect

(They rock, ~~when~~ IF they are around to do so)

**Also known as:** The former “hero”

### Role:

- » **No or little** architecture design **progress** is made
- » The architects are **always away**, doing **fascinating things**, or **fighting fires**.
- » It is very easy to slip in this mode, especially after some initial good progress and early successes, which brought some fame on the architects

# Architects: When do they get involved?



# When? (In progress)

- » Architecture Vision must be maintained throughout the project:
  - Inception / Analysis
  - Elaboration / Design
  - Construction / Implementation
  - Deployment / Release
  - Maintenance
- » Architecture is never finished



**How to become an Architect?**

# How?

- » Architecture accreditations
  - Open Group IT Architect Certification
  - IASA Certification
  - Microsoft Certified Architect
- » Education
  - Best practise techniques in area of specialisation
- » Experience, experience, experience
- » Read, listen and share

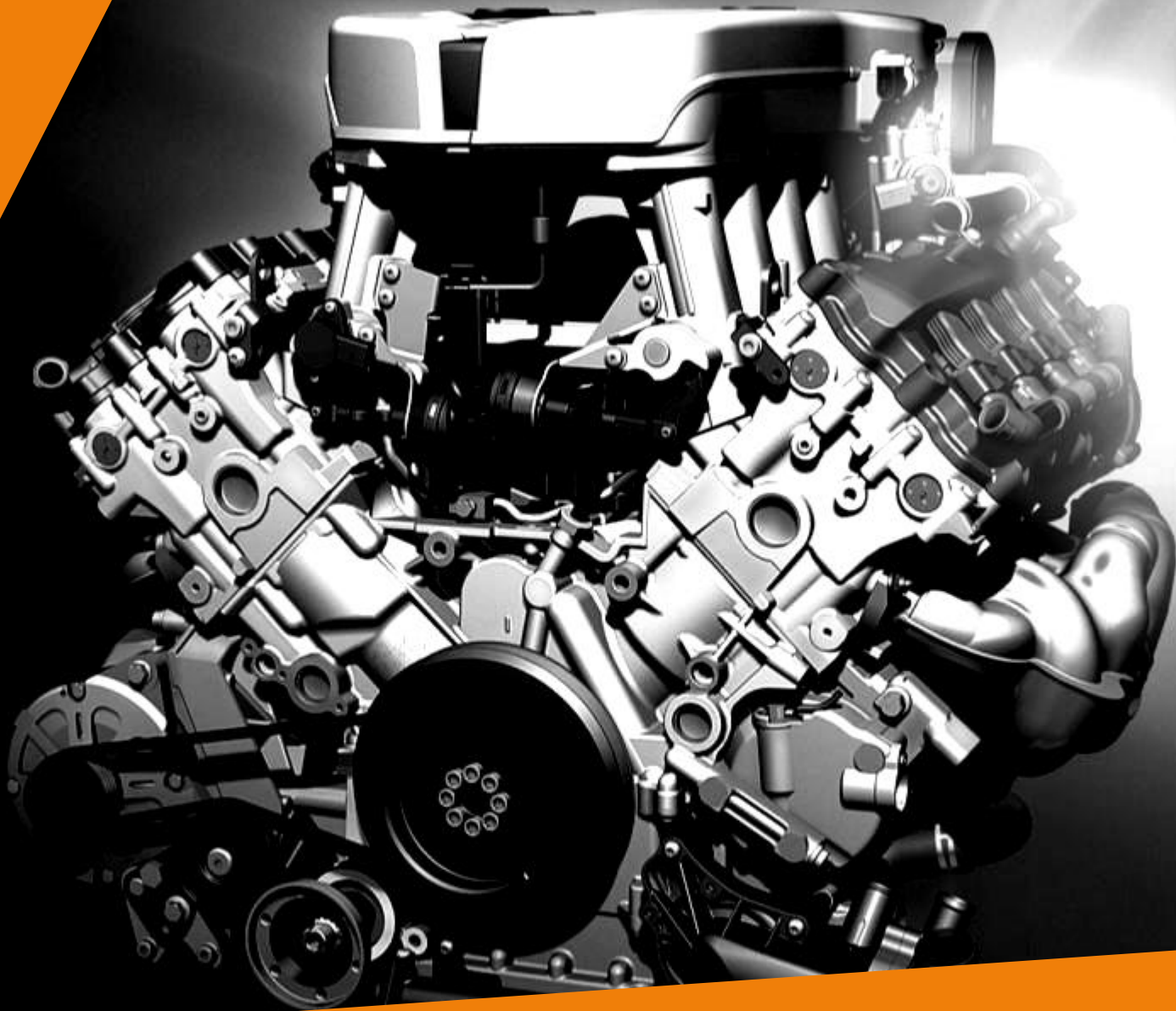
# Where can you learn more?

## » Online Communities

- [IBM developerWorks Architecture](#)
- [Microsoft Architecture Centre](#)
- [SEI Software Architecture](#)
- [IASA](#)
- [Open Group](#)

## » Podcasts

- [Thoughtworks “IT Matters” with Martin Fowler](#)
- [IEEE “On Architecture” with Grady Booch](#)
- [Software Engineering Radio](#)



**Computer systems: Machines or Structures?**

# Food for thought

- » The term **architecture** comes from a poor synonym relating IT to construction

Construction: Implementation is just laying bricks / concrete, right?

- » IT Architecture is more synonymous with manufacturing (i.e. Automotive)

We build machines that have a dynamic behavioural state and a static structural state.

# Discussion

# Future Events

» Every 2 months

» Upcoming Topics (*Not Final*)

- Enterprise Architecture
  - Practices, Techniques, Accreditation, Tools and Meta-modelling
- Infrastructure Architecture
  - Green computing and virtualisation
- Data Architecture
  - Data Architecture vs. Information Architecture
- Application Architecture
  - Domain-specific languages Model-driven development
- Business Architecture
  - TBC - Practices, Techniques, and Tools
- General
  - Common career challenges faced by IT architects

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