

EA History: since 1980

Traditional EA: what industry sources say

NewGen EA: EA and Agile Architecture



AM extra Traditional EA

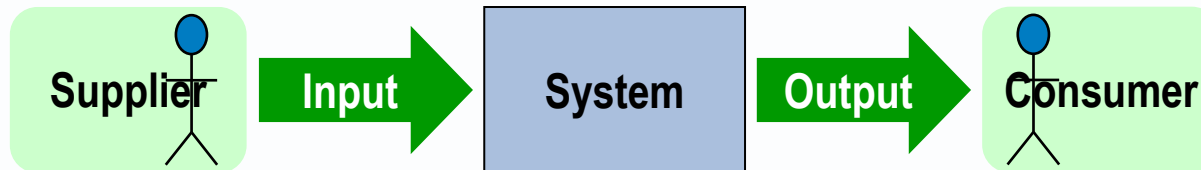
According to industry sources

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What is EA?

- ▶ “EA regards the enterprise as a system, or system of systems.”
 - ▶ TOGAF
-
- ▶ EA is about enterprise-scale business system planning
 - ▶ Or business capability planning if you prefer

- ▶ The architect of a business system/capability should start by encapsulating that system/capability.



- ▶ The value of a business system/capability lies in what it delivers by way of outputs (directions, products and services)
- ▶ Questions to be answered include:
 1. What external entities are to be monitored, directed or served?
 2. What outputs will be delivered to help achieve those ends?
 3. What inputs must be obtained to produce outputs? from what suppliers?
 4. What processes are needed to obtain inputs and produce outputs?
 5. What resources (human, computer, other) are needed to perform the processes?

Four decades of EA History

See “EA History”
slide show for more

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20th century sources

- ▶ [Business System Planning \(IBM\)](#)
- ▶ The famous PRISM paper
- ▶ NIST Enterprise Architecture Model.
- ▶ Stephen Spewak’s book “EA Planning”
- ▶ The US “IT Management Reform Act”
- ▶ The Federal CIO Council began developing FEAF

21st century sources

- ▶ A practical guide to Federal Enterprise Architecture
- ▶ The popular book "EA as Strategy"
- ▶ TOGAF version 9.1
- ▶ E&SA reference model, The British Computer Society

Now, a plethora of EA frameworks and EA bandwagon hoppers

Most modern EA frameworks indicate that

- ▶ EA strives for enterprise-wide optimisation of business systems.

- ▶ EA defines enterprise-level principles, standards, patterns and high-level architecture descriptions so as to:
 1. align information systems to business needs across architecture domains.
 2. enable **cross-organisational systemisation** of a business.
 3. encourage **integration and standardization** (reuse) of business processes.
 4. define a **strategic context** for business system changes.
 5. abstract **architecture documentation** from implementation
 6. organise and maintain architecture descriptions for future understanding and **change impact analysis**

1) Align information systems to business needs across architecture domains.

- ▶ “Enterprise Architecture...can be considered as a superset of Business, Data, Application, and Technology Architecture.”

TOGAF

- ▶ “EA is the determinant of survival in the **Information Age.**”
(Zachman)
- ▶ “**information-intensive organisations...**is the main focus”
(ArchiMate standard v2.1)
- ▶ “Today’s CEOs know that the effective **management and exploitation of information** through IT is a key factor to business success.”
(TOGAF 9.1)
- ▶ “EA structures and gives context to activities delivering concrete business outcomes, **primarily but not exclusively in the IT domain.**”
(TOGAF 9.1)

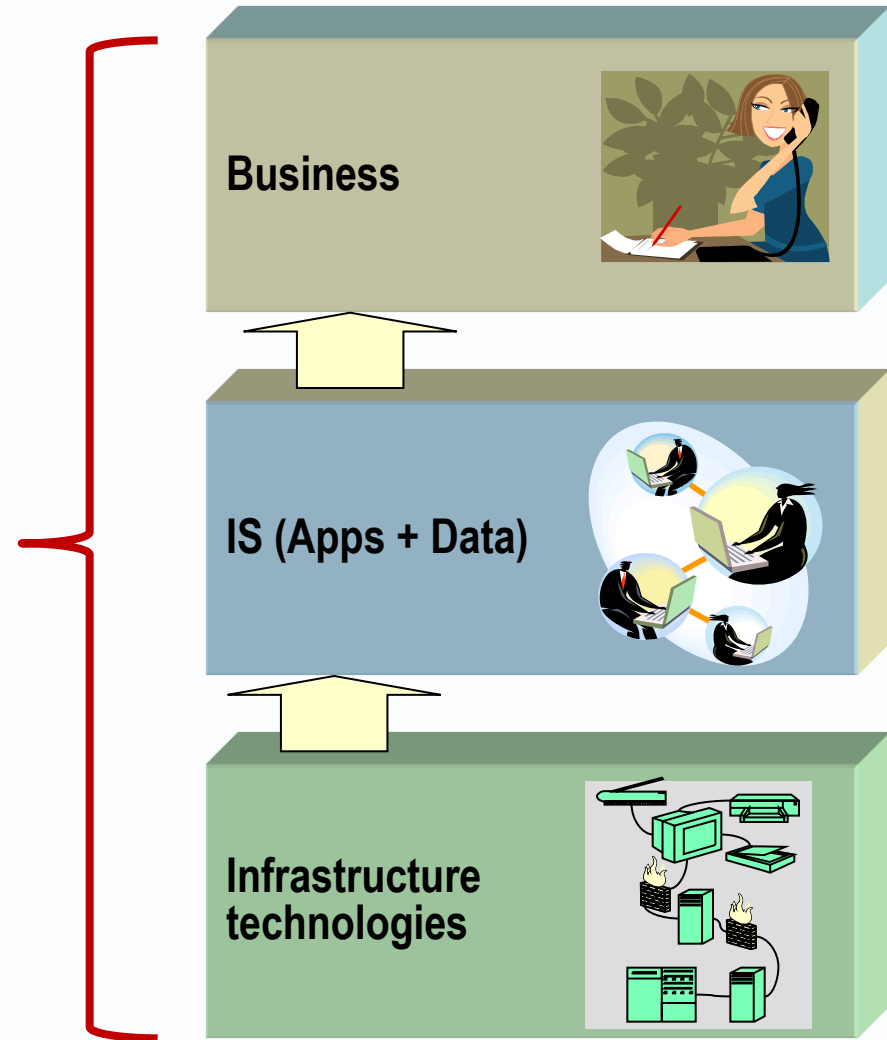
For over 30 years now – 4 primary architecture domains

▶ Since the PRISM report in 1986, every ISA framework and EA framework has been based on coordination of the same four domains

▶ “Enterprise Architecture...can be considered as a superset of

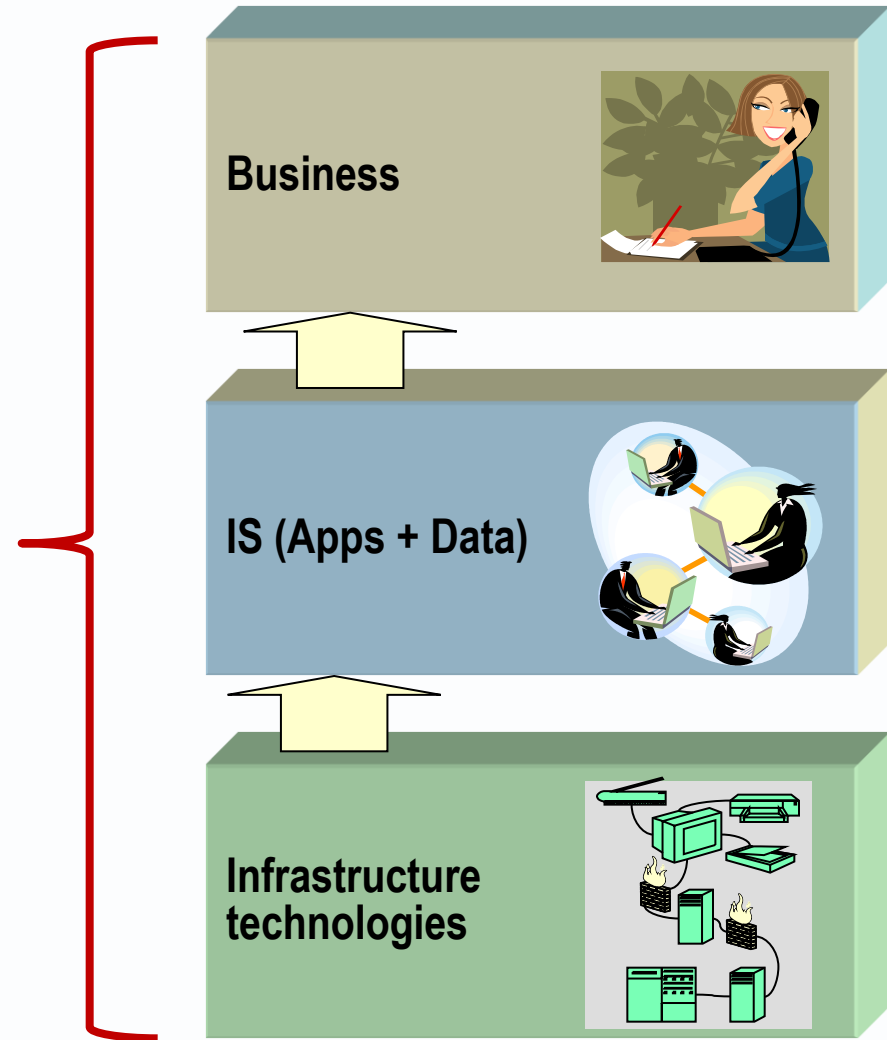
- Business
- Data
- Application, and
- Technology Architecture.”

TOGAF



Alignment of the primary architecture domains

- ▶ TOGAF says it is about “Holistic Enterprise Change”
- ▶ “TOGAF has ... become a framework for managing the entire **spectrum of change** required to transform an enterprise towards a target operating model.”



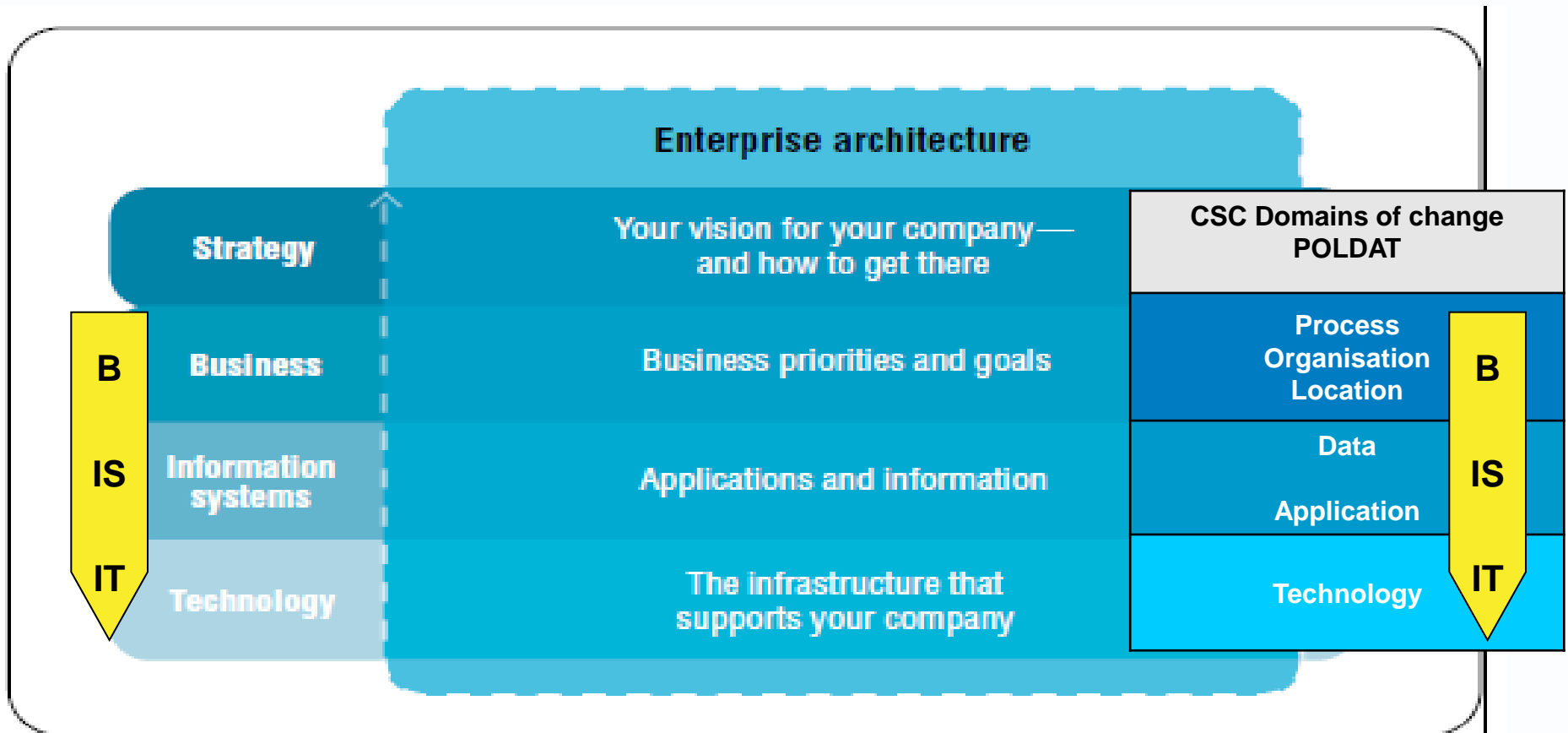
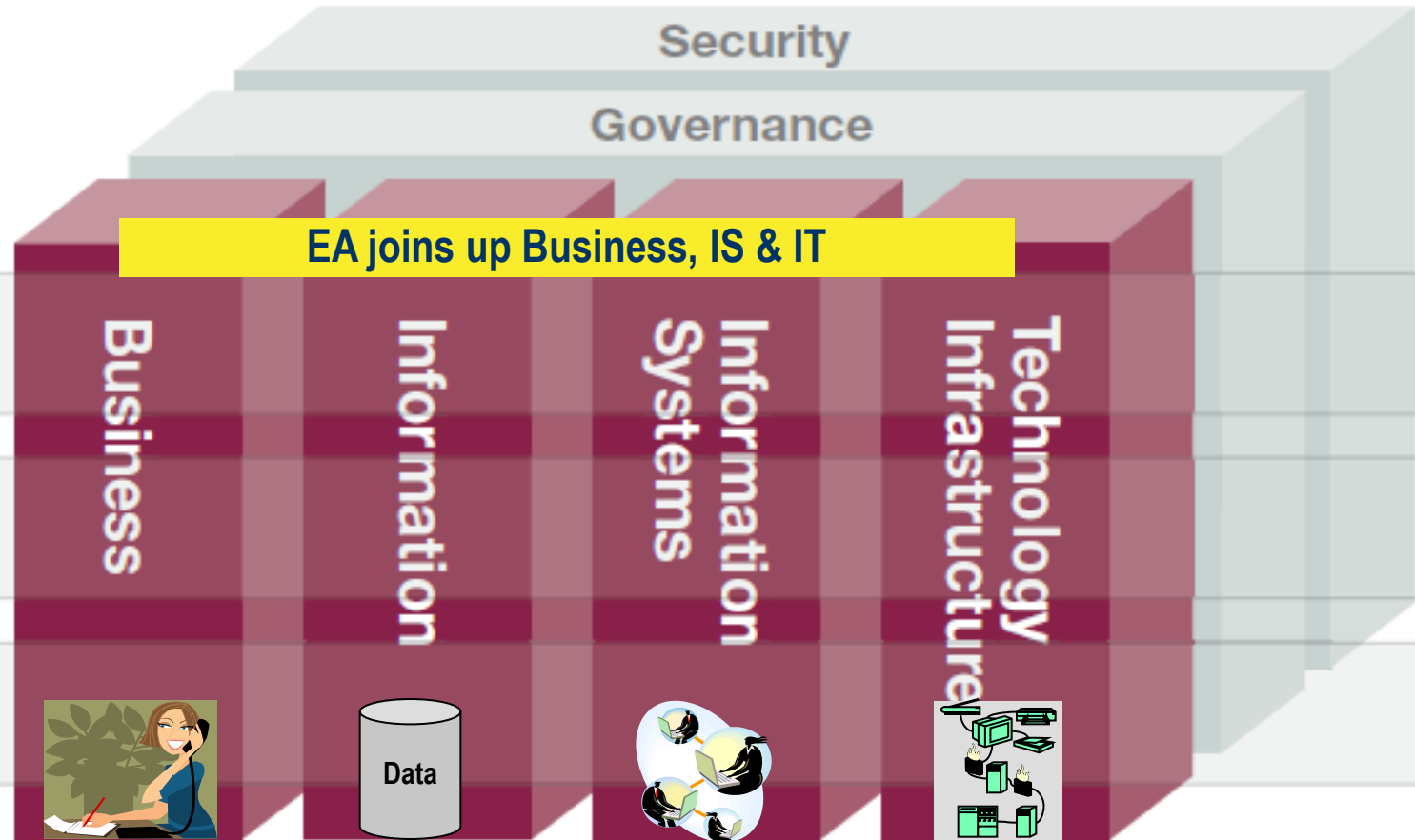


Figure 1: Enterprise architecture can give you insight into your organization on multiple levels.

Cap Gemini's Integrated Architecture Framework (IAF)

WHY?
Contextual



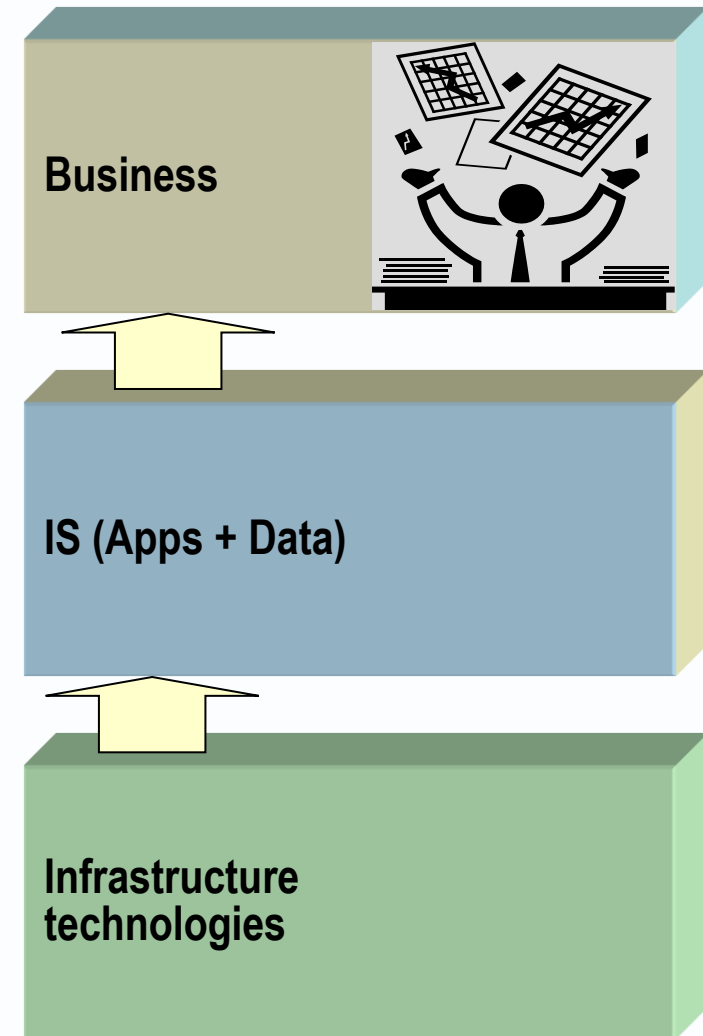
WHAT?
Conceptual

HOW?
Logical

WITH WHAT?
Physical

Architects look for opportunities to exploit information

- ▶ The digitisation of business processes has enabled business to:
 - standardise and integrate business processes and data to a degree impossible before
 - perform new information-related processes
 - gather new kinds of business intelligence
 - about entities and events of interest to business managers.
- ▶ Timely and good quality information helps managers:
 - Faster rate of change
 - Products and services change more frequently
 - Exponential growth in mobile devices and internet.
 - Global competition and knowledge sharing
 - Workers available across the world - any time of the day.
 - Intellectual property is hard to protect
 - Cross-enterprise communities exchange information.



2) Enable cross-organisational systemisation of a business.

- ▶ “the architecture crosses multiple systems, and multiple functional groups within the enterprise.” TOGAF

The enterprise as a mess (rather than a system)

- ▶ “Commonly, solution architects ...
- ▶ are driven to meet the immediate requirements of individual business units...
- ▶ only tactical stand-alone solutions are developed and implemented.”

IT Business Edge

The result is a mess of “silo systems”.

What is a silo system?

- ▶ A silo is an organisation unit or application that:
 - ▶ is **not standardised**
 - does not follow the same rules or processes as another doing the same thing
 - ▶ is **not joined up**
 - does not share information with another doing something different
 - ▶ does **not share/reuse common services**
 - at the business or technology level.

- ▶ Silos are the result of architects being given only narrow project-specific objectives.

- ▶ Where to find the motivation and ability to avoid or reduce silo solutions?

2001: FEAF: the US Chief CIO council

- ▶ “A practical guide to Federal Enterprise Architecture”
- ▶ “An enterprise architecture (EA) establishes
- ▶ the **Agency-wide roadmap** to achieve
- ▶ an Agency’s mission through
- ▶ optimal performance of its **core business processes** within an
- ▶ efficient information technology (IT) environment.”

2003: Zachman emphasised the breadth of EA

- ▶ Zachman says EA objectives are
 - **integration,**
 - **reuse,**
 - flexibility, and
 - reduced time-to-market.

- ▶ **“... The broader you define the analytical target, the better leverage you are going to get on integration, reusability, interoperability, etc...”**

- ▶

- ▶ If you draw the boundary more narrowly than your jurisdictional control, you will disintegrate your Enterprise, that is, you will build a “legacy.”

3) encourage integration and standardization (reuse) of business processes

- ▶ “The purpose of EA is to optimize across the enterprise the often fragmented legacy of processes into an integrated environment”

TOGAF

The enterprise as a mess (rather than a system)

▶ “Organizations can use **enterprise architecture and portfolio management approaches to**

- get the required knowledge
- streamline and rationalize the apps portfolio
- reduce redundancy, consolidate IT capabilities
- define sound IT governance policies.”

IT Toolbox

The “business operating model”

- ▶ TOGAF
- ▶ “The **business operating model** concept is useful to determine the nature and scope of the EA within an organization” TOGAF
- ▶ “Conducting EA [can be defined as] managing the spectrum of change required to transform an enterprise towards a **target operating model** [defined by] the necessary level of
 - business process integration and
 - business process standardization.
- ▶ for delivering goods and services to customers.” TOGAF

- ▶ “**EA as Strategy**” Ross, Weill and Robertson, 2006
- ▶ “Companies excel because they've [decided] which processes they must execute well, and have implemented the IT systems to **digitise those processes**”

“Operating model” for core business processes

High integration	Coordinated	Unified
Low integration	Diversified	Replicated
	Low standardisation	High standardisation

“Navigate the stages of EA maturity” (after “EA as Strategy”)

▶ You can't deploy information systems (to integrate digitised business processes) without having platform technologies in place.

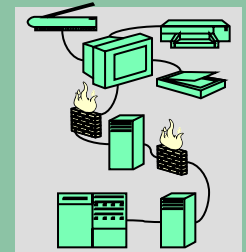
4 Business modularity (6%)
Reusable modules



3 Optimised core (34%)
No data redundancy
Enterprise systems (shared apps)



2 Standardised technology (48%)
Fewer platforms
Technology standards
Shared infrastructure



1 Business silos (12%)
Local apps and infrastructure

“Common use applications” - an EA principle

- ▶ “Large corporations and government agencies may comprise multiple enterprises, and may develop and maintain a number of independent EAs to address each one.

Optimised core

No data redundancy
Enterprise systems (shared apps)

- ▶ However, there is often **much in common about the information systems in each enterprise**, and there is usually great potential for gain in the use of a **common architecture framework.**” TOGAF

4) Define a strategic context for business system changes.

- ▶ “TOGAF is intended to be a framework ... to establish the EA team as having board-level, **strategic** and cross-organisational authority... needed for cross-organisational EA to be successful.”

▶ “An EA [defines] a **strategic context** for the evolution of the IT system in response to the constantly changing needs of the business environment.”

TOGAF

▶ “An enterprise architect... has professional relationships with **executives of the enterprise** to gather and articulate the technical vision, and to produce the strategic plan for realizing it.”

TOGAF

▶ [EA is] a high-level process for:

- “**C-level executives** determined to get IT right”
- “a road map for the CIO and IT organisation to follow”.
- “improving **strategy execution** and lowering IT costs”
- “creating a foundation for business execution...
 - an IT infrastructure and digitised processes that implement your company's core capabilities.”

“EA as Strategy” Ross, Weill and Roberston,

- ▶ EA works from strategy through business, IS & IT domains

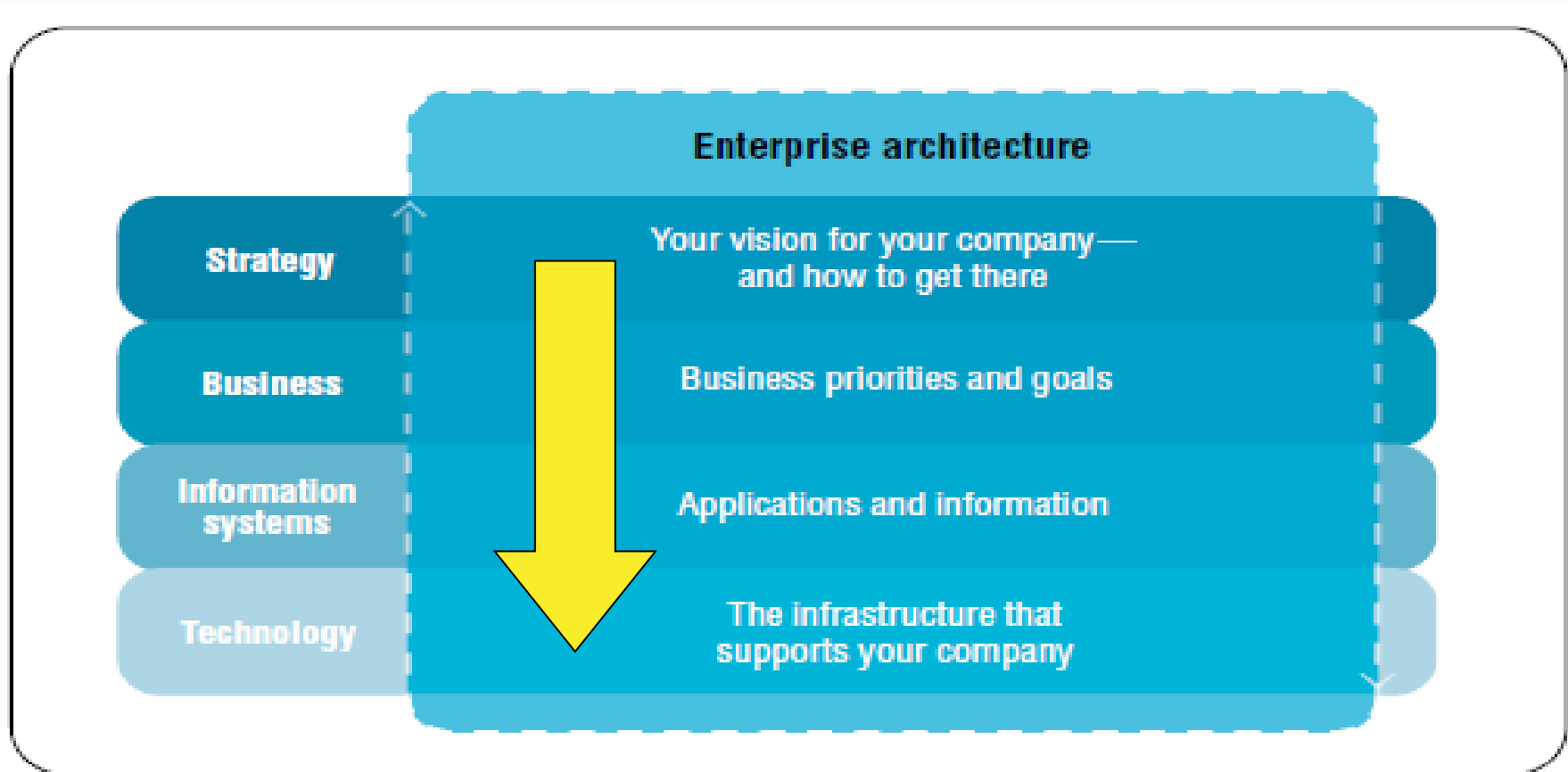


Figure 1: Enterprise architecture can give you insight into your organization on multiple levels.

SFIA says EA is more *strategic*

- ▶ SFIA defines EA development in 16 sentences in which
 - “**strategy**”, “**strategies**” and “**strategic**” appear 18 times.
 - “**setting strategies, policies, standards and practices**” appears twice

A major global service provider names key roles as below

▶ In the bid phase:

- Solution Manager
- Requirements Manager
- Lead Solution Architect
- Solution Architect(s)
- + other management roles

▶ A key output: the "Solution Definition Doc."

▶ In the delivery phase:

- Business Analyst(s)
- Requirements Manager
- Lead Technical Architects
- Technical Architect(s)
- + other management roles

▶ A key output of High-Level Design is the "Architecture."

Notice: no mention of an enterprise architect.

Assumed to be a strategic role within the customer organisation.

Also, a governance role, not employed to produce design docs.

4) Abstract architecture documentation from implementation

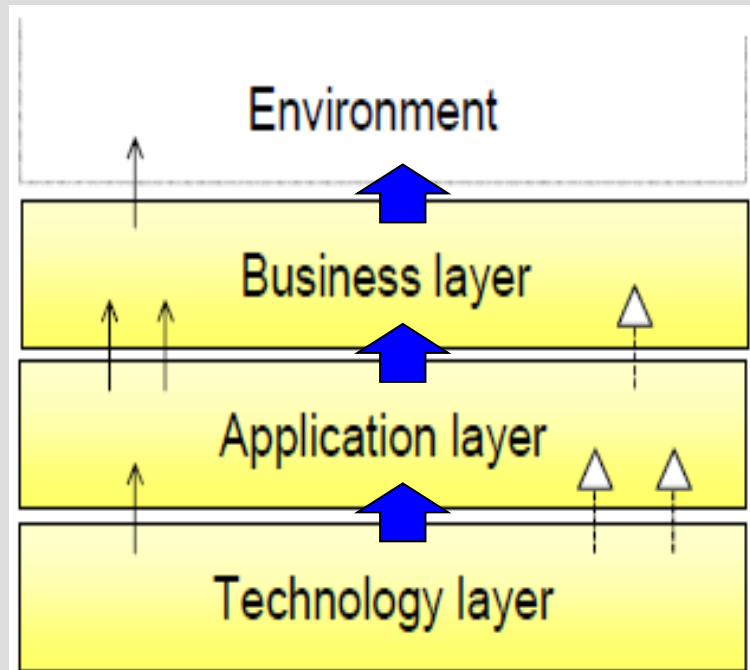
- ▶ “the architect is not the builder, and **must remain at a level of abstraction.**” TOGAF

2011: TOGAF emphasised the importance of abstraction

- ▶ “the architect is not the builder, and **must remain at a level of abstraction** necessary to ensure that they do not get in the way of practical implementation.”
- ▶ “Physical elements in an enterprise architecture may still be **considerably abstracted from Solution Architecture**, design, or implementation views.”

TOGAF

- ▶ **“Service Orientation:** A way of thinking in terms of services and service-based development and the outcomes of services.”
- ▶ “It is the responsibility of the architect to know and concentrate on the **critical few details and interfaces** that really matter, and not to become overloaded with the rest.”



TOGAF


“The ArchiMate Language Primer”

- ▶ Higher level designers direct and constrain lower level designers

- ▶ Higher level designers set out
 - targets
 - abstract and idealised design
 - general principles, patterns and standards and reference models

- ▶ Lower level designers are supposed to
 - reach the targets.
 - realise the designs
 - apply the standards, principles, patterns and reference models

Architecture as higher level design

Higher level design	Directs and constrains 	Lower level design
Strategies and road maps	Longer time -> Shorter time	Shorter term sprints and deadlines
Broader goals, longer processes and coarser-grained subsystems	Composition -> Decomposition	Narrower requirements, shorter processes and finer-grained components
Standards, principles, patterns and reference models	Generalisation -> Specialisation	Application of standards, principles, patterns and reference models
Business needs and idealised system descriptions	Idealisation -> Realisation	Physical technology solutions
Encapsulation by services in interfaces	External -> Internal	Realisation by internal roles and process
Required services and processes	Behaviour -> Structure	Designed roles and interfaces

HLD directs and constrains LLD

- ▶ An enterprise architect <directs and constrains> solution architects
- ▶ A solution architect <directs and constrains> software architects and other technical specialists
- ▶ A software architect <directs and constrains> software developers

5) organise and maintain architecture descriptions for future understanding and change impact analysis

- ▶ “If you are not building (and storing, managing and changing) primitive models, you are not doing Architecture. You are doing implementations.”

John Zachman

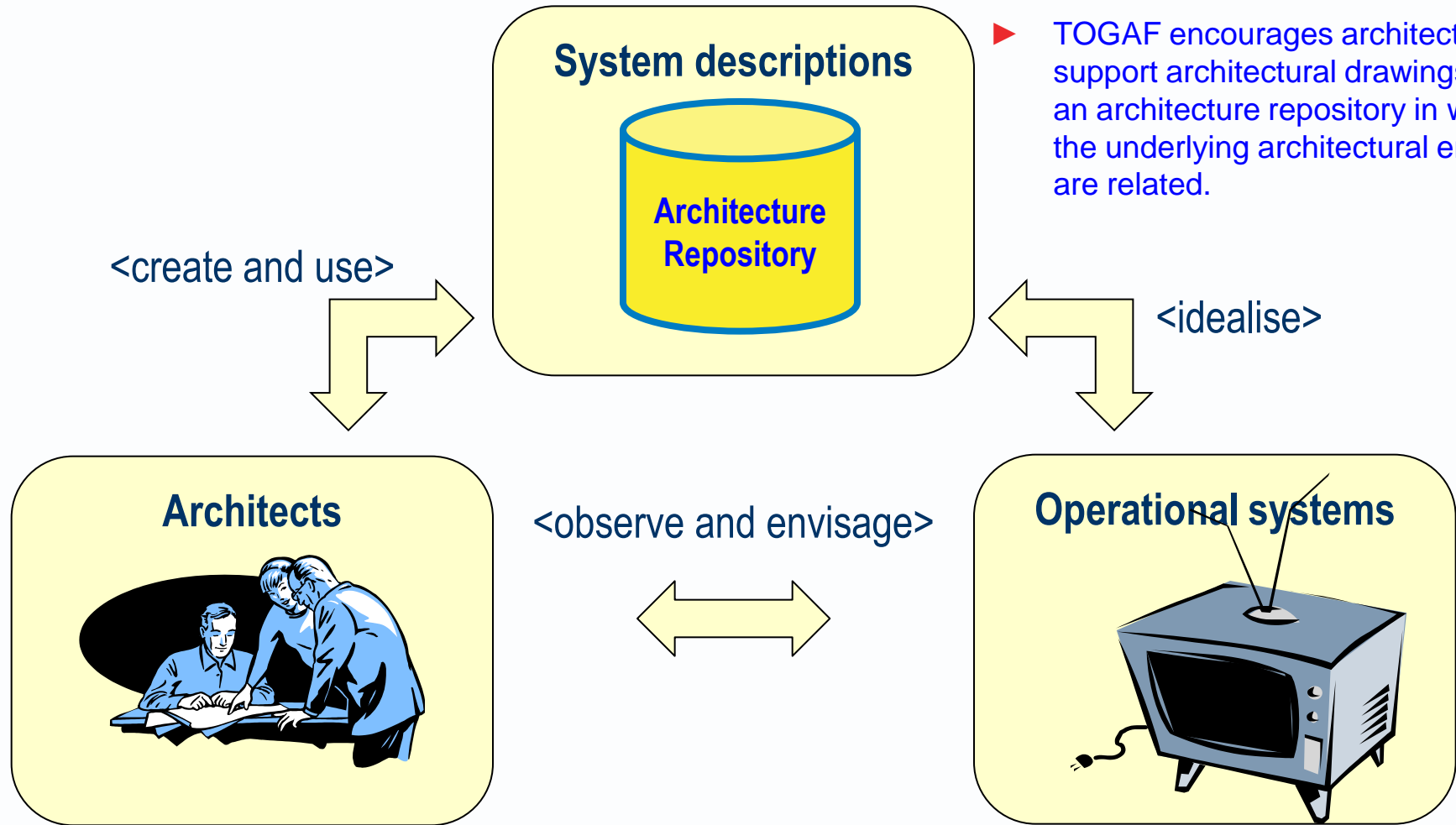
2003: Zachman emphasised the importance of documentation

- ▶ **“If it gets so complex that you can’t remember everything all at the same time, you have to write it down (Architecture).**
- ▶ Then, if you want to change it, you start with what you wrote down (Architecture), the baseline for managing change.
- ▶ If you are not observing the engineering design principles..., you are not going to realize the engineering design objectives of alignment, integration, reusability, interoperability, flexibility, reduced time-to-market, etc.
- ▶ ... you are never going to appreciably reduce time-to-market until you have something in inventory before you get the order.
- ▶ **If you are not building (and storing, managing and changing) primitive models, you are not doing Architecture. You are doing implementations.**

- ▶ “An EA” is the enterprise’s architecture description, recorded some kind of architecture repository.” TOGAF

““the EA is permanent and manages the *EA artefacts* delivered by projects.” TOGAF

Organise and maintain architecture descriptions



- ▶ “A TOGAF architecture is based on:
 - defining architectural **building blocks** within architecture catalogs,
 - specifying relationships between building blocks in **matrices**, and then
 - presenting communication **diagrams** that show in a precise and concise way what the architecture is.”

- ▶ “It is necessary to provide a fully featured **enterprise architecture metamodel** for content.”

- ▶ “Operating a mature Architecture Capability within a large enterprise creates a huge volume of architectural output.

- ▶ Effective management and leverage of these architectural work products require a **formal taxonomy** for different types of architectural asset alongside dedicated processes and tools for architectural content storage.”

- ▶ **Avancier Methods** are useful with all architecture frameworks that share similar ends and means
- ▶ <http://avancier.website>

