

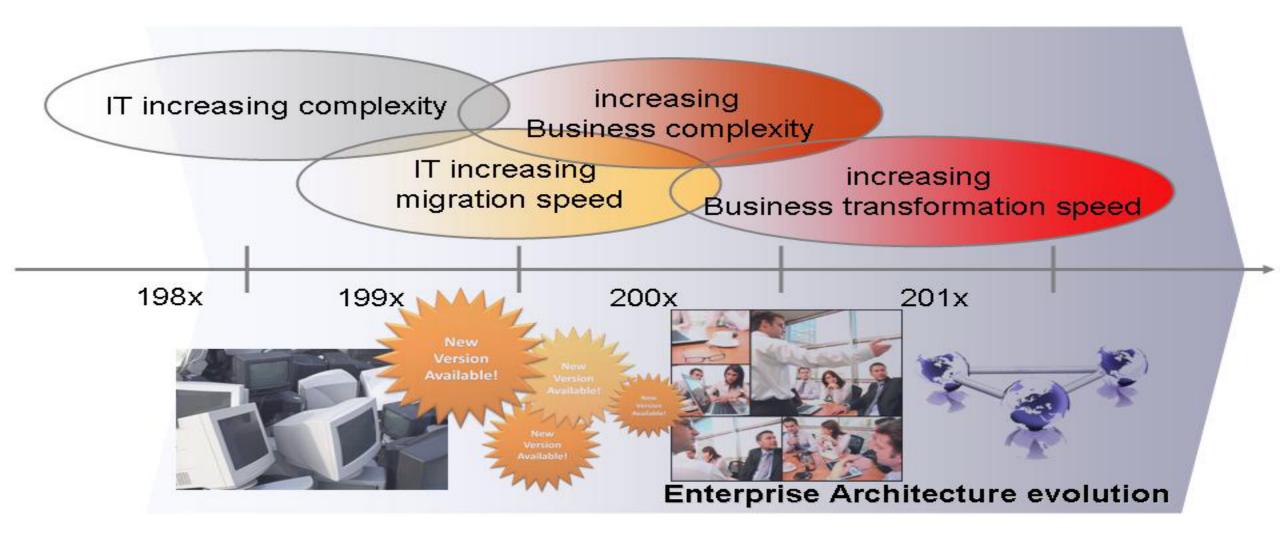
# CONTENT

- Enterprise Architecture over the age
- Enterprise Architecture Framework
  - Zachman
  - Togaf
- Enterprise Architecture reference model

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# "Enterprise" Architecture Challenges over the ages



#### IT Project Statistics



#### Success Rate of Change Projects

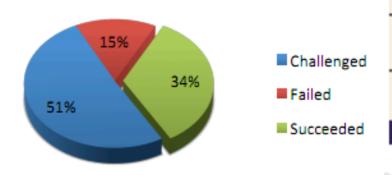


Figure 1 Source: Standish Group, Chaos Study 2011

#### Table I

### Standish project benchmarks over the years

Year	Successful (%)	Challenged (%)	Failed (%)	
1994	16	53	31	
1996	27	33	40	
1998	26	46	28	
2000	28	49	23	
2004	29	53	18	
2006	35	46	19	
2009	32	44	24	

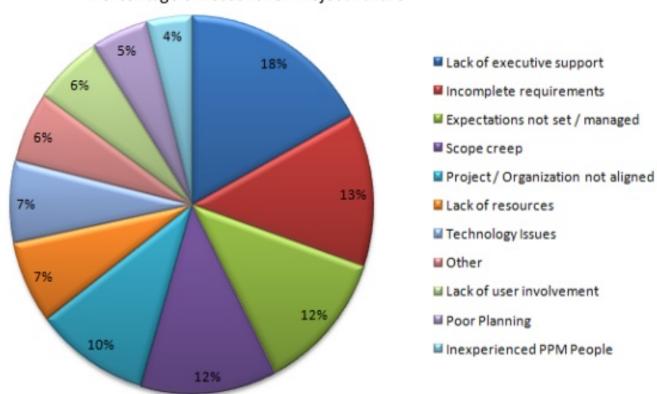
Success/Failure Rates of IT Projects

#### REASONS

#### **Contributing Factors**

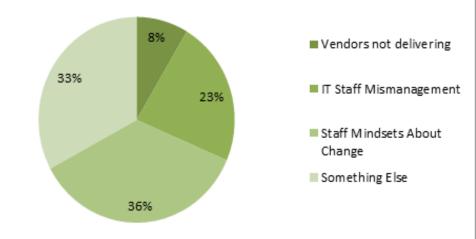
uxc consulting

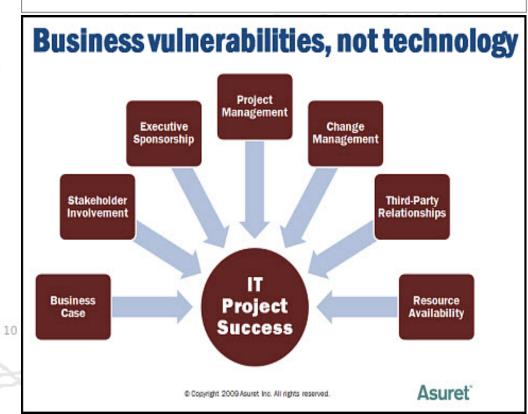
#### Percentage of reasons for Project Failure



Arras People Benchmark Report 2010

#### Reasons for IT project /roll out failure





# Enterprise Architecture Conceptual

สถาปัตยกรรมองค์กร (Enterprise Architecture: EA)

เป็นแนวความคิดใหม่ที่บูรณาการระหว่าง ระบบเทคโนโล<mark>ยีสารสนเทศ</mark> เข้ากับ ธุรกิจ

อย่างเป็นระบบ โดยการมองสถาปัตยกรรมธุรกิจ (Business Architecture) แล้ว ดำเนินการออกแบบระบบเทคโนโลยีสารสนเทศ ให้เชื่อมโยงกับการดำเนินงานทาง ธุรกิจได้

อย่างสอดคล้องและมีประสิทธิภาพ ทั้งในระดับ Architecture ไปจนถึง Roadmap ขององค์กร เพื่อผลักดันให้องค์กรสามารถดำเนินการตามนโยบายและวิสัยทัศน์ของ องค์กร

#### Enterprise Architecture Artifacts

#### **Business Architecture**

Defines the business strategy, governance, organization, and key business processes

#### **Data Architecture**

 Describes the structure of an organization's logical and physical data assets and data management resources

#### **Application Architecture**

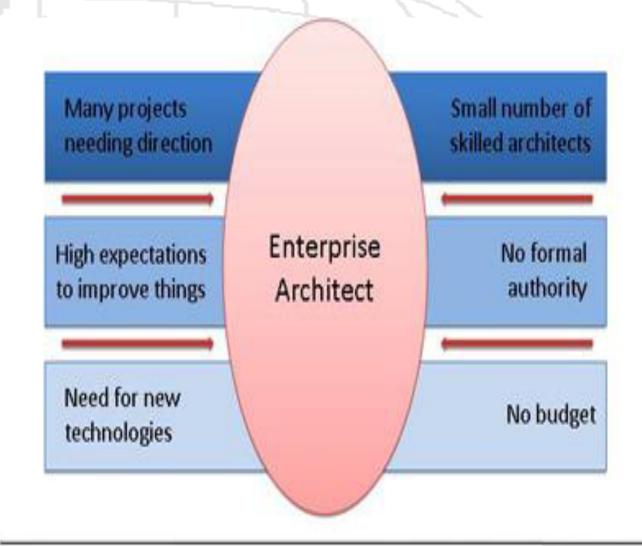
 A blue print for the individual application systems to be deployed, their interactions, and their relationships to the core business processes of the organization

#### **Technology Architecture**

 Hardware, Software IT infrastructure, middleware, networks, communications, processing, standards, etc

# Why need Enterprise Architecture?

- ในปัจจุบันระบบเทคโนโลยี สารสนเทศ เป็นส่วน สำคัญต่อการ ขับเคลื่อนธุรกิจขององค์กร
- ปัญหาส่วนใหญ่คือการขาดความ เชื่อมโยงระหว่างระบบเทคโนโลยี สารสนเทศกับธุรกิจ



#### Application with out EA

Student Lifecycle Core Diagram (Technology View "As Is") Nikki Rogers, Enterprise Architect, University of Bristol, April 2014 Student Experience Progr... □ Applying □ Funding Register/ Pay Fees Learning Assess... ⇒ Graduate⇔ Awareness Enrole Accommodat. Feed... Application Ambass.. about mades and probable Comms Employer Alumni Provisi... □ Finance⊏ Support) Curriculum □ Scheduling ( Careers □ Staff □ Assessing Progressing = Marketing relationships Relationships **Pastoral** Development Students and Induction Care Recruitment Administrative, Teaching & Management Pipeline

Business

Intelligence

(copy)

Statutory

Reporting

(copy)

The more RED = the

offer is.

more diversification, the

more green = the more

unified the solution on

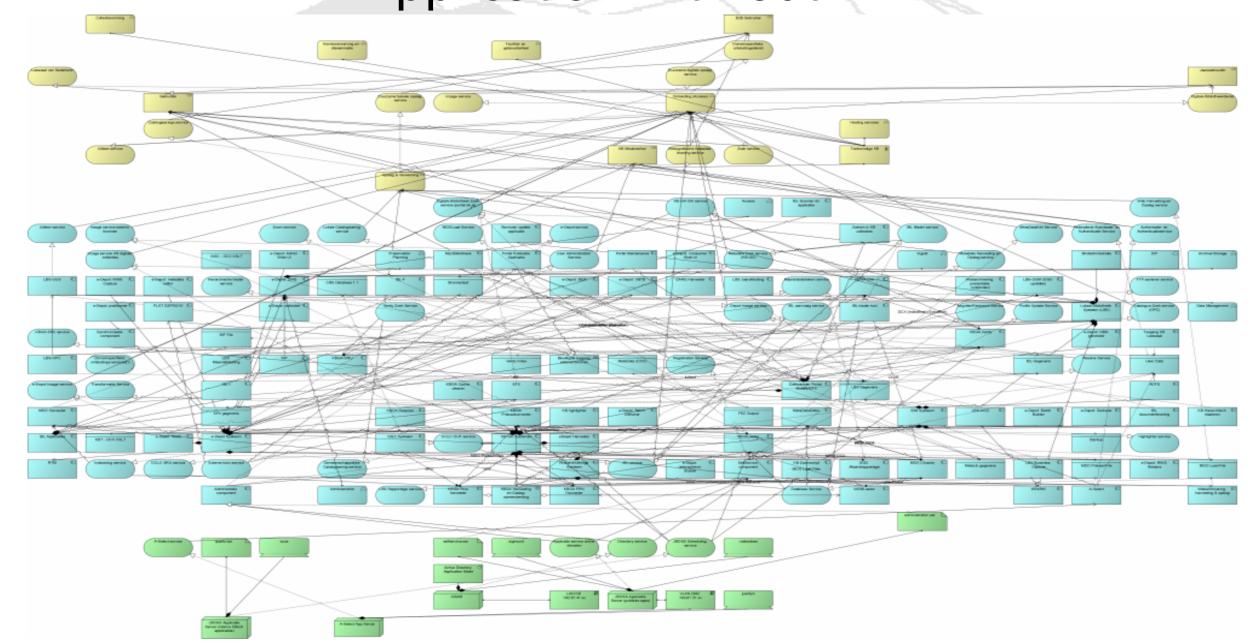
Potential business

objects plans for

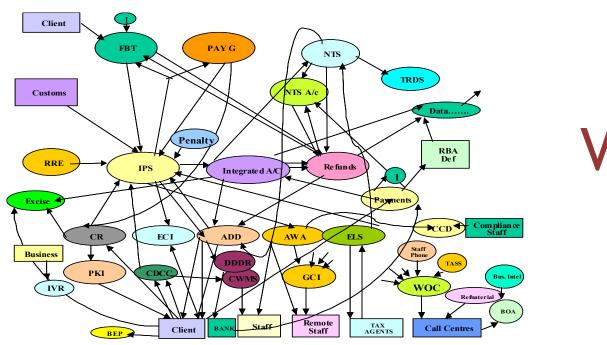
reporting extra to

Hobson's EMT AY

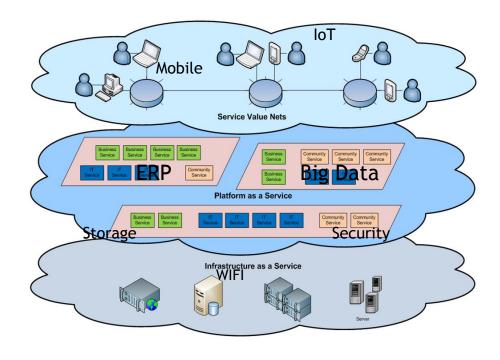
# Application with out EA



#### without EA vs. with EA



VS.



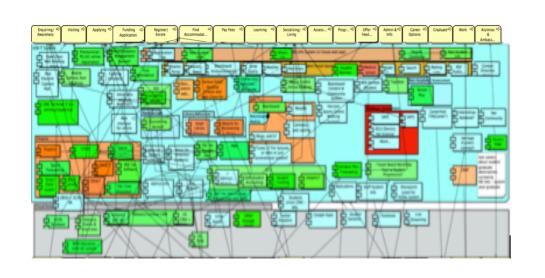
Without Enterprise Architecture
Inefficient IT

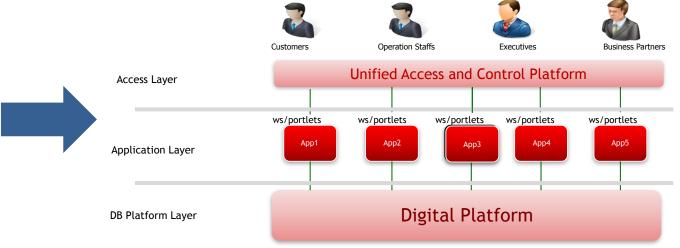
Complex and Delay Response

With Enterprise Architecture
Productive IT

Cloud, Big Data, Social, Mobile

#### **Technology Architecture Improvement**





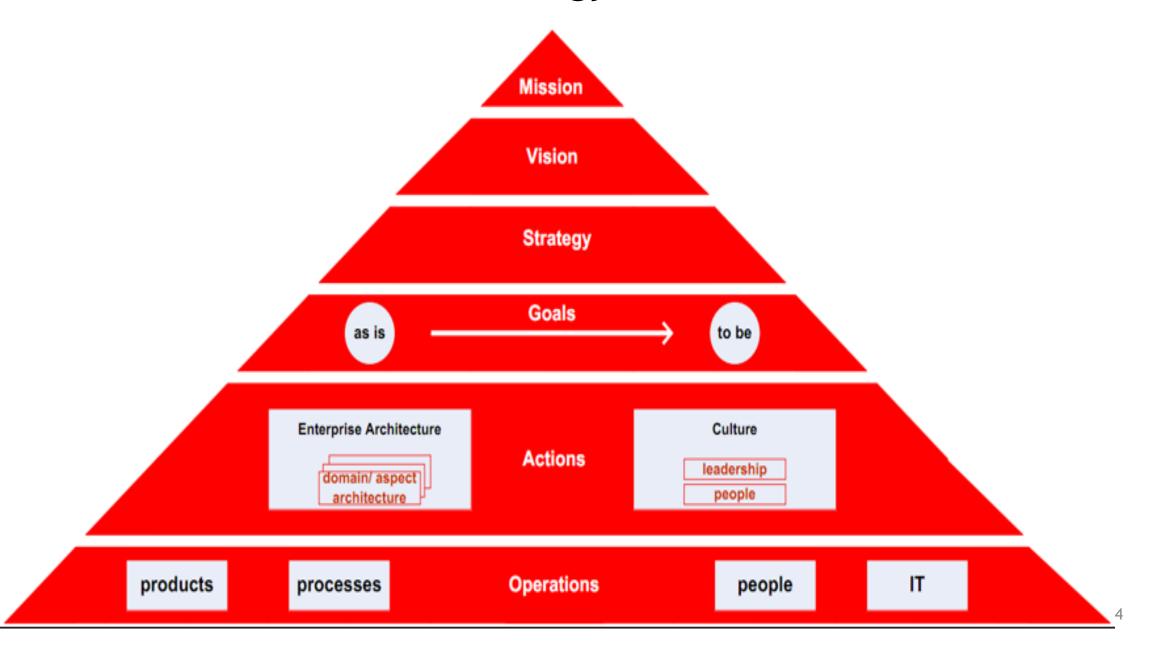
#### **Current Technology Architecture**

- เพิ่มบริการใหม่ๆยาก
- ต้องใช้ตุ้นทุนสูงในการขยายระบบ
- ใช้เวลามากในการแก้ปัญหา
- เกิดความเสี่ยงสูงต่อการดำเนินธุรกิจ

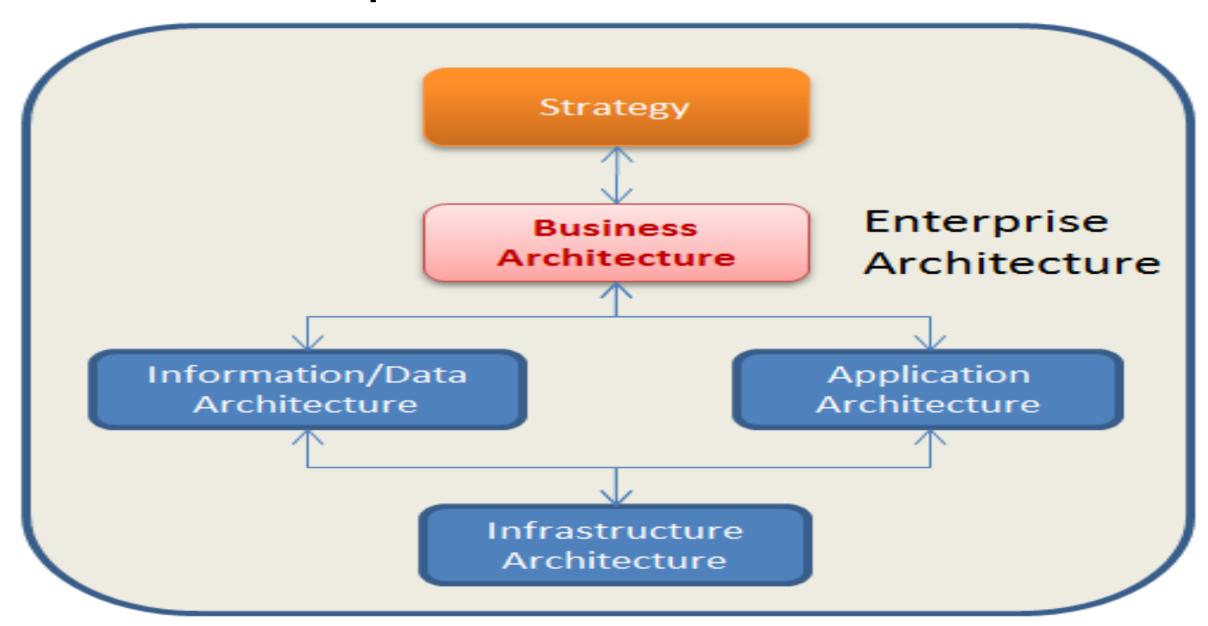
#### **Target Technology Architecture**

- สร้าง common platform
- เพิ่มความยืดหยุ่นให้กับเงื่อนไขบริการใหม่
- สามารถผลิด application ได้เร็วขึ้น
- ลดความเสี่ยงต่อการดำเนินการ

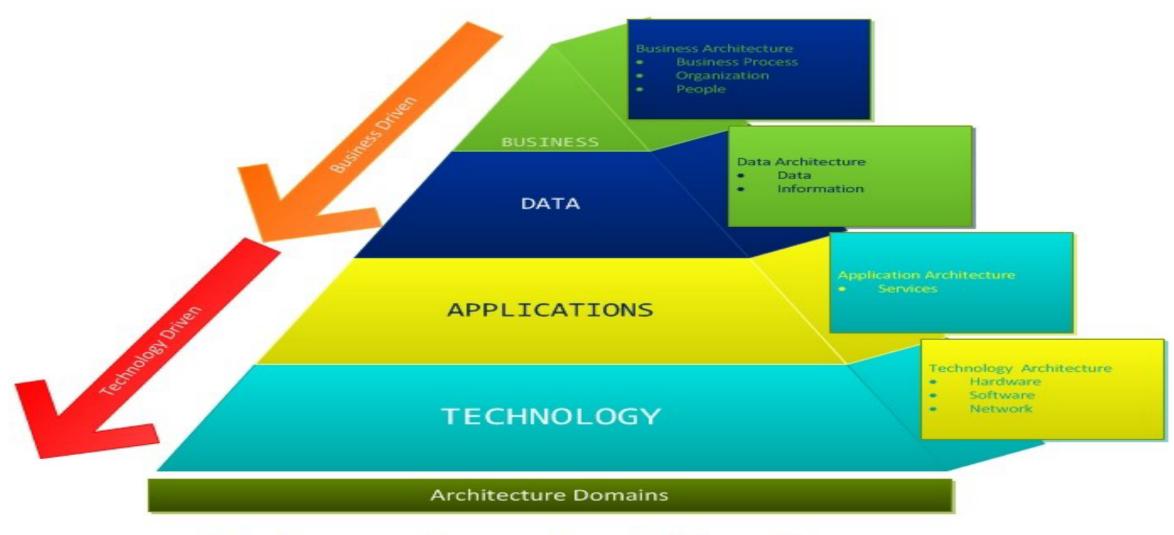
#### Transform Strategy to outcomes



#### **Enterprise Architecture Overview**

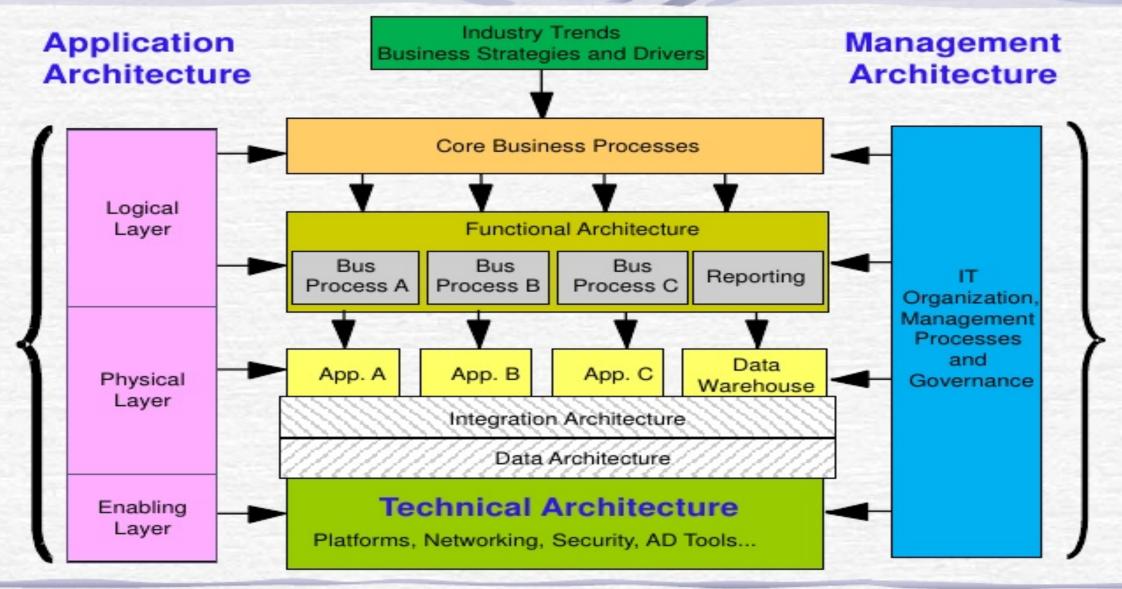


# Enterprise Architecture Conceptual



**Enterprise Architecture** 

#### Enterprise Architecture Conceptual Layers



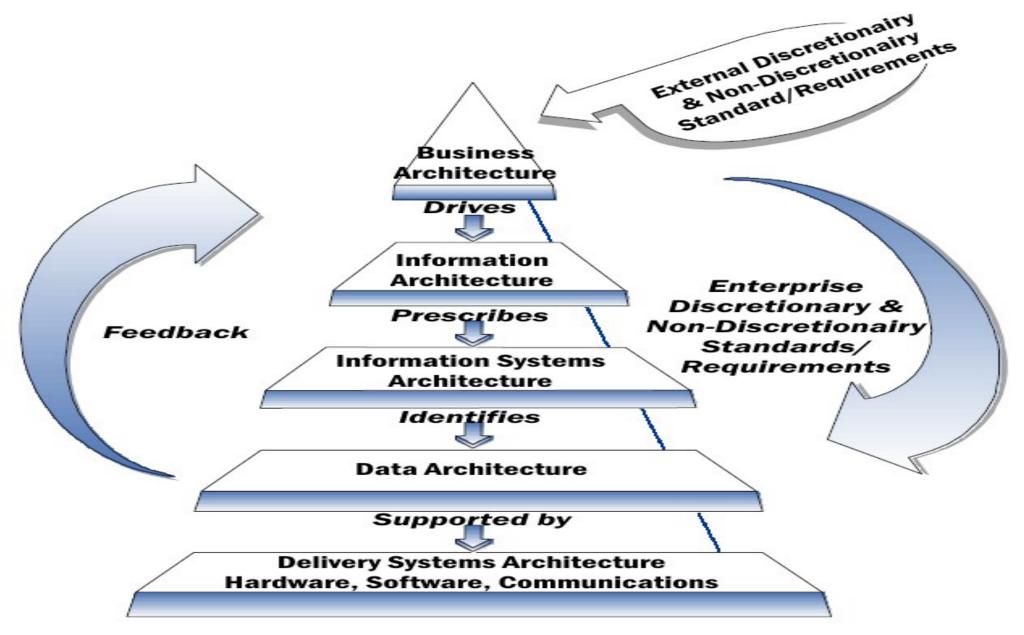
NAI

#### Enterprise Architecture Domains & Sub-Domains

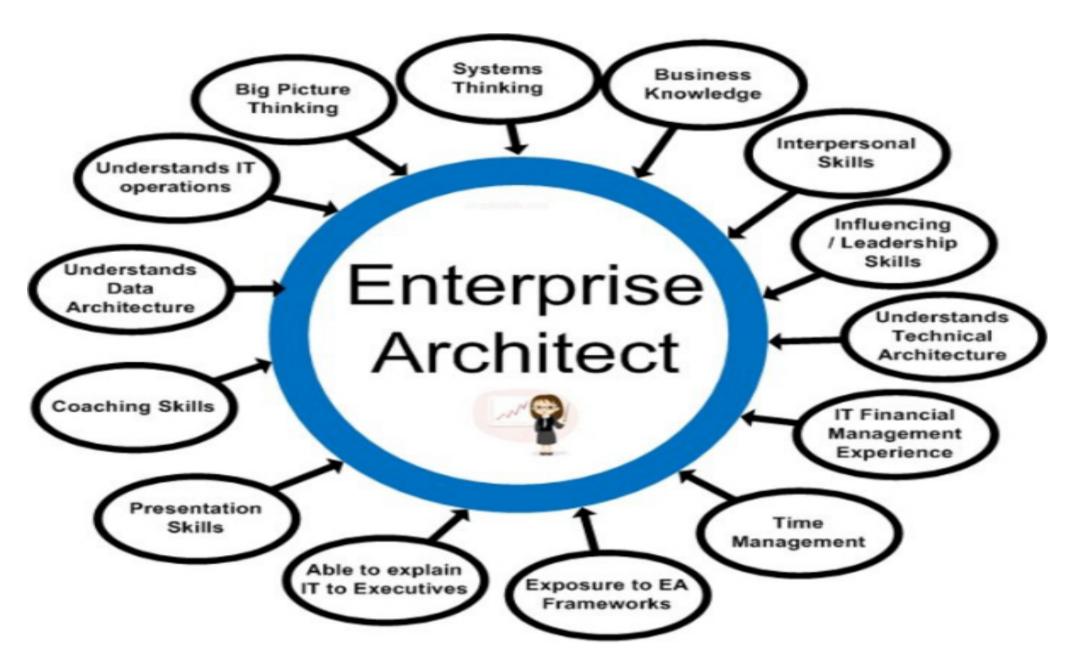
Sub-Domains: EA Domains are further divided into sub-domains depending on the elements within a domain.

Application **Enterprise** Business Information Technical Architecture Architecture Architecture Architecture **Arhitecture Domains** Infrastructure Telecom **Business Strategy** SOA **Data Architecture** Computing **Data Network** BI Analytics & Event Architecture Storage **Transport** Governance Reporting **Enterprise** Application Metadata & Middleware Organization Wireless Portfolio Semantics **Arhitecture Technical Application Master Data** Database Voice Process **Sub-Domains** Development Management **Data Quality** Video Device **Data Integration** Monitoring Projects Solution **Business** Application Information Infrastructure Telecom **Architecture** Architects Architects Architects Architects Architects (Projects)

#### **Enterprise Architecture Deployment**



#### Enterprise Architecture need Expertise



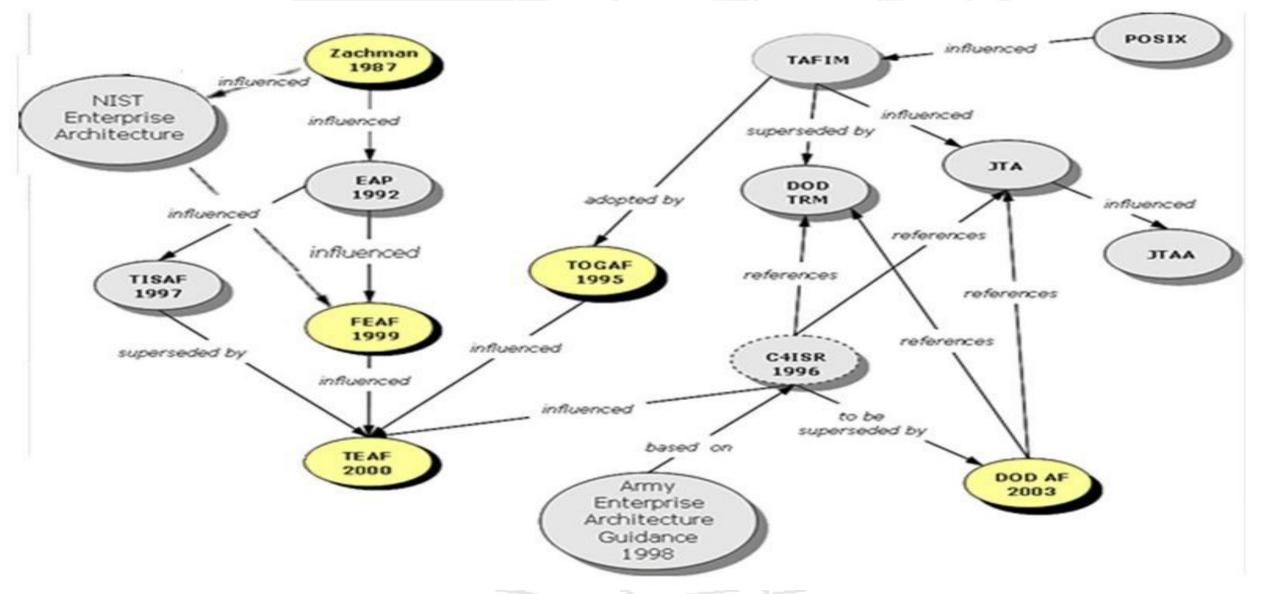
# CONTENT

- Enterprise Architecture over the age
- Enterprise Architecture Framework
  - Zachman
  - Togaf
- Enterprise Architecture reference model

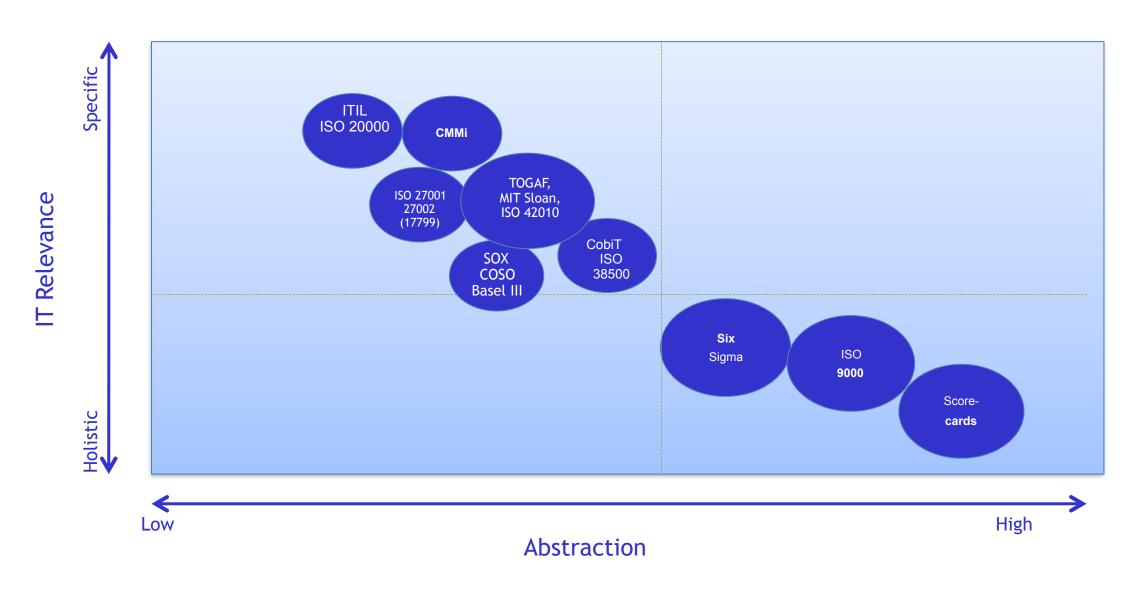
#### Enterprise Architecture Framework Concept

- A Methodology to design and develop the architecture วิทยาการเพื่อการออกแบบและพัฒนาให้ได้สถาปัตยกรรมที่วัตถุประสงค์และเหมาะสม
- As must describe the methods to design an information system in terms of its building blocks and to integrate them together ต้องมีการอธิบายวิธีการออกแบบระบบข้อมูล ในลักษณะของ โครงสร้างที่มีการเชื่อม โยงกัน
- Tools and terminologies ต้องการเครื่องมือและเทคนิคเฉพาะด้าน
- Interoperability standards
   ต้องมีการทำงานร่วมกันและมีมาตรฐานเดียวกัน

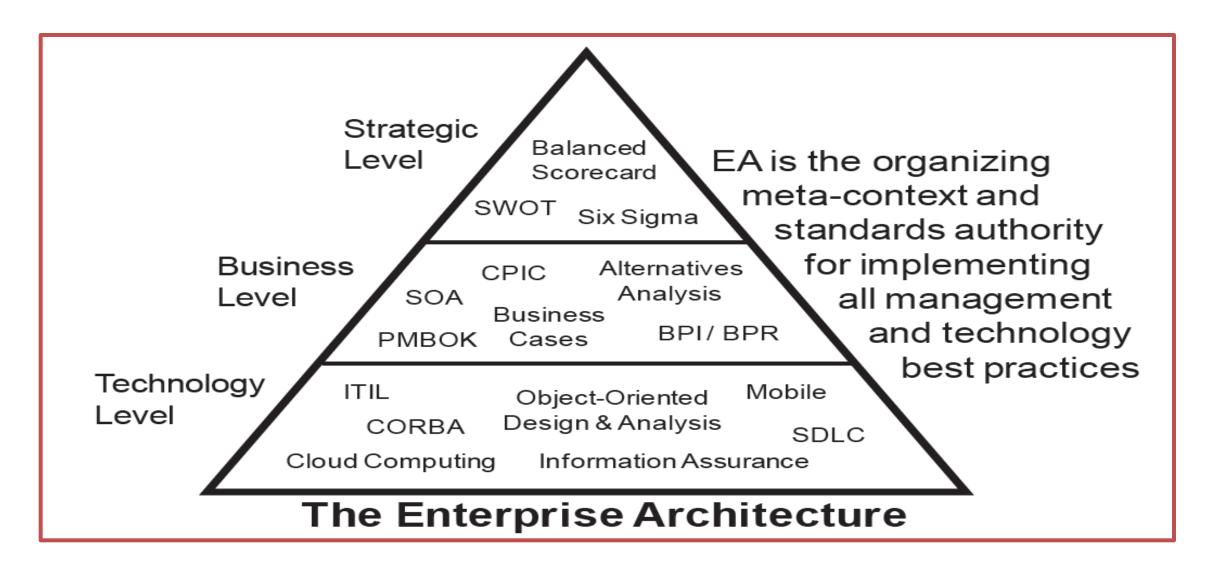
## **EA Frameworks Evolution**



#### There are many related standards/guidelines

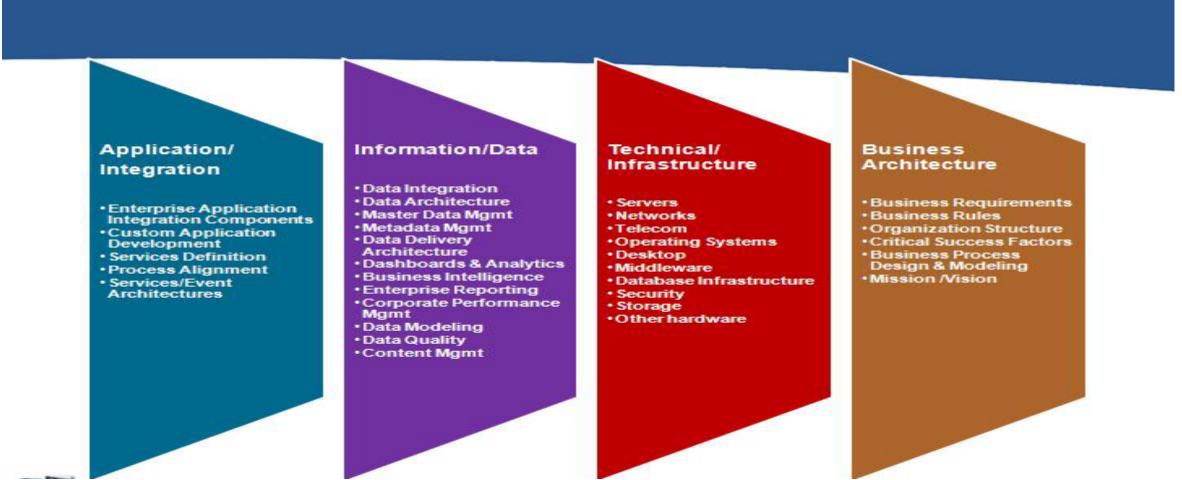


#### Organizing management and technology best practices



#### Enterprise Architecture Domains & Sub Domains

#### **EA Domains and Sub Domains**



#### **Enterprise Architecture Component**

Business Outcome (Single View of Customer, Single View of Products) Enterprise Business Process Strategy Strategy Planning EA Readiness for Future Enterprise & AS-Is State of Enterprise Customer Services Product Processing Goals & Objectives Account Management Standards Earnings) Payment Processing Customer retention, Inventory) Principles Financial Management Guiding Principles Templates Portfolio Management Guidelines Regulatory Reporting Value Measures Best Practices Enterprise Value Measures (ROI, Profit Patterns Methodologies Portf olio Janagemene Design Models Information Data Architecture & Business Unit Management Business Information Market. Organization Customer Data Structure Roles & Responsibilities Domain/Technical Skills Technology Competencies Application Services Performance Management Product Platform Integration Services Infrastructure Services Packaged Services Extended Enterprise Associations Third Party Service External Systems Gateways

Example Enterprise Architecture Framework Diagram (ideal situation) **DEFINITION** Enterprise Architecture glossary OWNER **DEFINITION DEFINITION** DEFINITION Governance Architecture OWNER **OWNER OWNER** concepts & building blocks elements objects components building blocks principles objects objects building blocks rules & standards domains patterns DEFINITION Human Capital Architecture **Business Architecture OWNER** components Security Architecture Process Architecture Service Architecture components domains domains objects components domains domains DEFINITION Information Architecture OWNER standards standards elements elements rules& Data Architecture Application Architecture DEFINITION Technical Architecture OWNER concepts & concepts & patterns principles principles patterns concepts & elements components objects principles building blocks rules & standards patterns domains

# Enterprise Architecture by Objective















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# **Strategy thru Finally Outcome**







#### without EA vs. with EA



VS.



Quick build and difficult to scale Difficult to apply security Design for scale and maintain Secure architecture for growth

# EA: ZACHMAN Framework

- Zachman developed a structure or framework for defining and capturing an architecture
- This framework provides for 6 perspectives or "windows" from which to view the enterprise.

	DATA What	FUNCTION How	NETWORK #7here	PEOPLE Who	TIME #han	MOTIVATION 18'hy	
SCOPE (CONTEXTUAL)	List of Things important to the Business	List of Properties the Business Performs	List of Locations in which the Business Operates	Unit of Organizations Important to the Business	List of Evenis Significant to the Sustness	List of Business Goals/Strat	SCOPE (CONTEXTUAL)
Planer	Districts - Chargol Dustriess Thing	Function * Class of Business Process	Node = Major Business Location	People = Major Organizations	Time * Major Business Brent	Enduklésansvétajor Bus. Goal Ortical Success Factor	Plamer
ENTERPRISE MODEL (CONCEPTUAL	e.g. Semantic Model	e.g. Dusiness Process Wodel	e.g. Business Logistics System	e.g. Work Flow Wodel	eg Vider Schedus	e.g. Bushwat Flan	ENTERPRISE MODEL (CONCEPTUAL)
Owner	Ent = Business Ently Rein = Business Relationship	Proc. = Business Process I/O = Business Resources	Node = Business Location Link = Business Linkage	People = Organization Unit Work = Work Product	Time = Business Blent Cycle = Business Cycle	End = Business Objective Means = Business Strategy	Owner
SYSTEM MODEL (LOGICAL)	+¢ Logical Cata Nodel	e.g. Application Architecture	e.g. Distributed System Architecture	e.g. Human Interface Anothecture	A S Proceeding Structure	e.g., Dustreet Rule Model	SYSTEM MODEL (LOGICAL)
Designer	Ent - Data Entity Rein - Data Relationship	Proc. n Application Function to in upper views	Node = US Punction (Processor, Storage, etc) Link = Line Characteristics	People = Role Work = Deliverable	Time * System Direct Cycle * Processing Cycle	End + Structural Assertion Means +Action Assertion	Designer
TECHNOLOGY MODEL (PHYSICAL)	e.g. Physical Data Model	eg. Systen Dedga	e.g Technology Anthleduse	e.g. Presentation Analysischer	e a Control Brudare	eş Rde Dedşi G G G G G G G G G G G G G G G G G G G	TECHNOLOGY MODEL (PHYSICAL)
Builder	Ent = Segment/Table/etc. Rein = Pointer/Keyletc.	Proc.* Computer Function I/O * Data Elements/Sets	Node = HardwareSystem Software Link = Line Specifications	Pecole # User Work # Screen Format	Time = Execute Cycle = Component Cycle	End = Condition Means = Action	Builder
DETAILED REPRESEN- TATIONS (OUT-OF- CONTEXT) Sub- Contractor	e.g. Data Definition	eg Program	e.g. Network Architecture	e.g. Security Architecture	e.g. Timing Definition	e.g. Rule Specification  End = Sub-condition	DETAILED REPRESEN- TATIONS (OUT-OF CONTEXT)
FUNCTIONING ENTERPRISE	Rein = Address e.g. DATA	IO = Cortrol Block	Link = Protocols e.g. NETWORK	Work = Job • g. ORGANIZATION	eg. SCHEDULE	Means = Step	FUNCTIONING ENTERPRISE

# Enterprise Architecture: Zachman framework

	What	How	Where	Who	When	Why		
Scope							Scope	
Business Model	<b>\$</b>	+	80	000			Business Model	
System Model	<del></del>		P-Q	9-9-9-	F		System Model	
Technology Model	모모	4		6-9-0	1	- E	Technology Model	
Detailed Representations							Detailed Representations	
Functioning Enterprise	4 %	4 Th	4	4 Th	£	4 Th	Functioning Enterprise	
	What	How	Where	Who	When	Why		

# Enterprise Architecture: Zachman Framework

	Why	How	What	Where	When	Who
Contextual	Business Drivers, Mission Alignment	ConOps, Value Chain	List of Business Objects and Subjects	List of Locations	List of Key Business Events	List of Roles, COIs & Organization
Conceptual	Requirements, Performance Objectives, Service Descriptions	Business Services Process Flow, Process Definitions (BPMN)	ERD, Information Exchange Matrix, Business Vocabularies	Locations mapped to roles and processes	Business Domain Event Models	Mapping of roles and processes to COIs and Organization
Logical	Business Rules, Business & Technical Service Levels	Process Simulation (BPEL & UML) Use Cases (UML)ห	Data Flow Diagrams, Business Taxonomy, Ontology, & Semantics	Systems Architecture, Managed Services locations	Process Orchestration	User Profiles
Physical	Business Activity Monitoring	Business Process Management, COTS Applications	Data Domain Services	Infrastructure Domain Services	Business Process Management, COTS Applications	Security Domain Services (SSO)

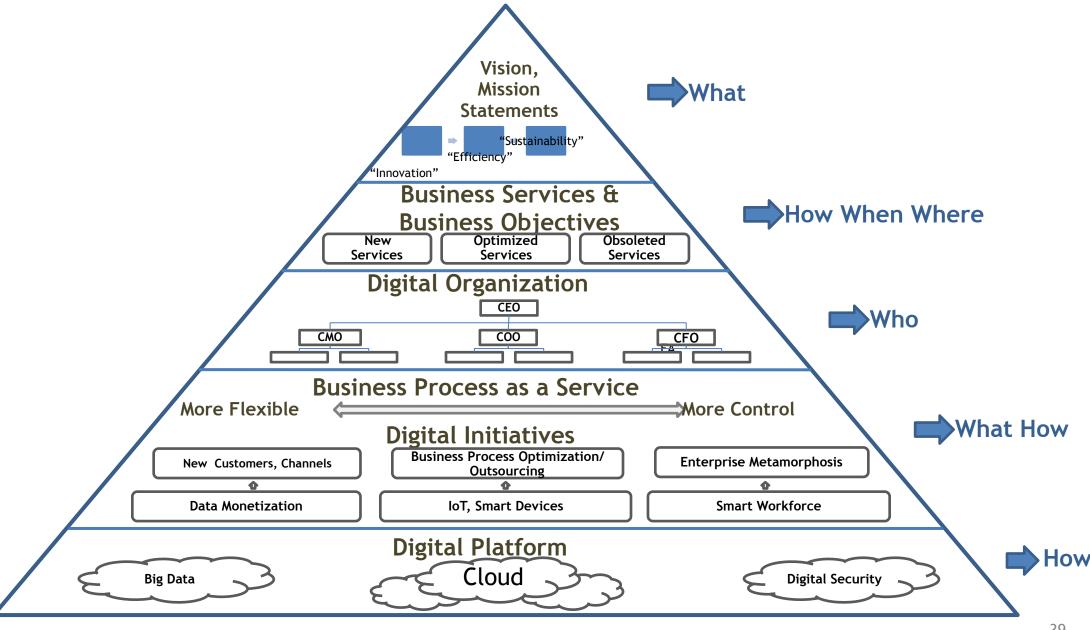
#### Enterprise Architecture: Zachman framework

	What? Data	How? Function	Where? Network	Who? People	When? Time	Why? Motivation	
Planner's Viewpoint Contextual							Scope
Owner's Viewpoint Conceptual							Enterprise Models
Designer's Viewpoint Logical							Systems Models
Builder's Viewpoint Physical							Technology Models
Sub-contractor's Viewpoint Out-of-context							Detailed Representations
Functioning Enterprise							Actual Systems

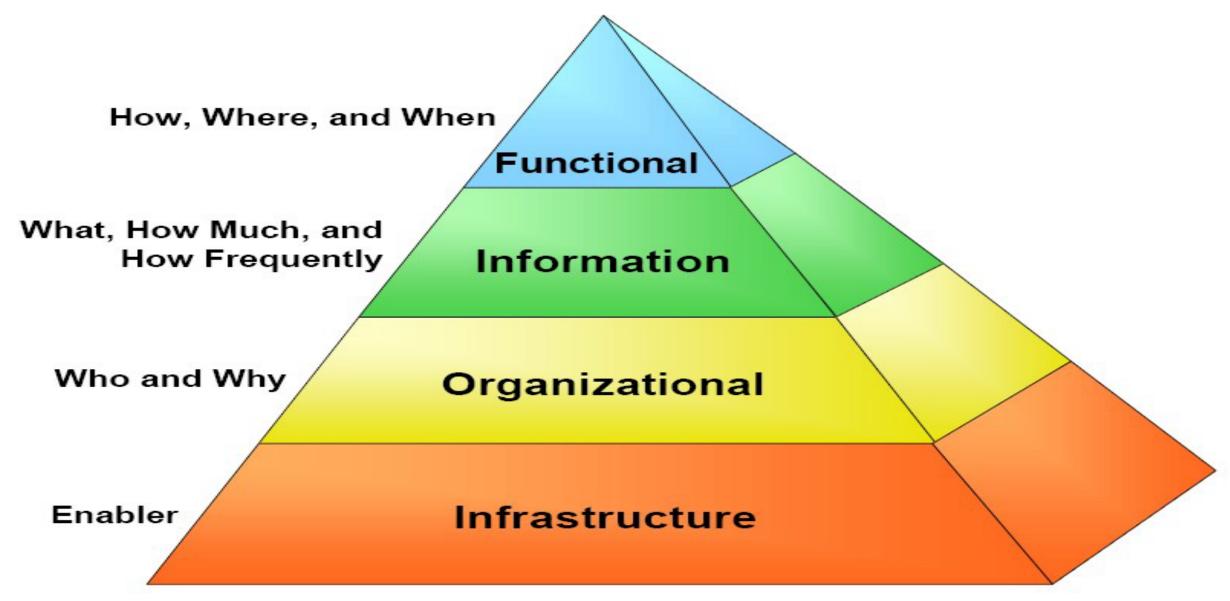
# Zachman Framework

	DATA What	FUNCTION How	NETWORK Where	PEOPLE Who	TIME When	MOTIVATION Why
Objective/Scope (contextual) Role: Planner	List of things important in the business	List of Business Processes	List of Business Locations	List of important Organizations	List of Events	List of Business Goal & Strategies
Enterprise Model (conceptual) Role: Owner	Conceptual Data/ Object Model	Business Process Model	Business Logistics System	Work Flow Model	Master Schedule	Business Plan
System Model (logical) Role:Designer	Logical Data Model	System Architecture Model	Distributed Systems Architecture	Human Interface Architecture	Processing Structure	Business Rule Model
Technology Model (physical) Role:Builder	Physical Data/Class Model	Technology Design Model	Technology Architecture	Presentation Architecture	Control Structure	Rule Design
Detailed Reprentation (out of context) Role: Programmer	Data Definition	Program	Network Architecture	Security Architecture	Timing Definition	Rule Speculation
Functioning Enterprise Role: User	Usable Data	Working Function	Usable Network	Functioning Organization	Implemented Schedule	Working Strategy

## Digital Transformation Reference Model



# Enterprise Architecture Framework



# EA: TOGAF Framework

# TOGAF 9: Using ADM



- The ADM consists of 9 phases:
  - The Preliminary Phase
  - Phase A: Architecture Vision
  - Phase B: Business Architecture
  - Phase C: Information Systems
     Architectures
  - Phase D: Technology Architecture
  - Phase E: Opportunities & Solutions
  - Phase F: Migration Planning
  - Phase G: Implementation Governance
  - Phase H: Architecture Change Management
  - And Requirements Management
- Each phase contains a series of steps

#### TOGAF Architecture Development Method

The ADM method consists of eight main phases. As preliminary work, the enterprise architecture framework and architecture principles are fixed for the effort. In the following, a short description of the phases.

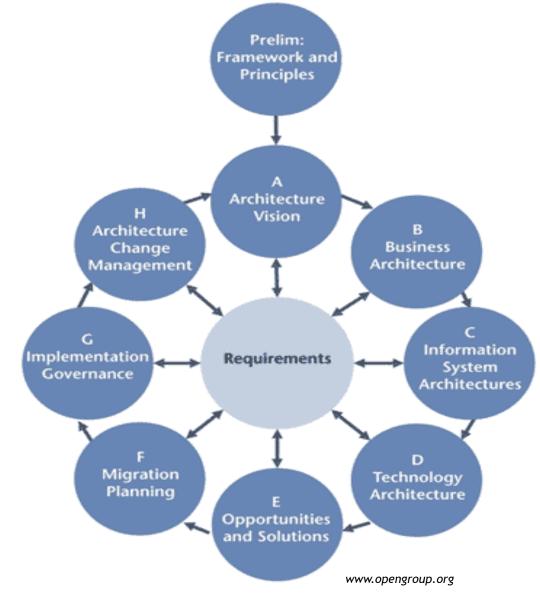
A. Architecture vision is the analysis phase of EA project. The project is organized; the scope and domain requirements and constraints are stated. Business scenarios can be used for this.

B. In the Business architecture phase, the current baseline architecture is stated, target architecture is designed and a gap analysis between the two takes place.

C. Information systems architecture consists of the parts Data and Applications. For Data architecture, the types and sources of data needed in the enterprise are defined and a data model is created. A gap analysis is conducted and data model is compared with the business architecture. As to the applications, the applications needed to meet the specified business requirements and data model are turned into an applications architecture and are checked back with the business architecture.

- D. For Technology architecture, the previous phases deliver inputs. In this phase, a baseline architecture is stated, and the target technology architecture is designed.
- E. Opportunities and solutions is the evaluation phase, where the solutions are selected.
- F. Migration planning is the point for checking dependencies in the environment and preparing for implementation of the target architecture.
- G. Implementation and Governance is about the administration of implementation and deployment phase of the development project.

  H. Architecture change management is the maintenance phase. A new baseline is created and changes in business environment are monitored as well as new technology opportunities.

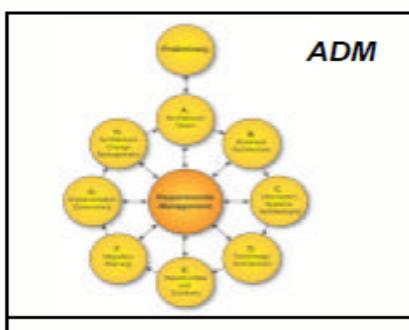


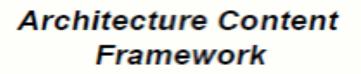
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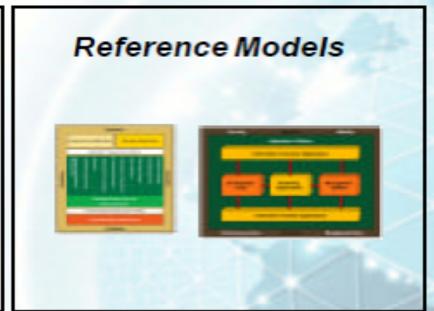
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# TOGAF 9 Components





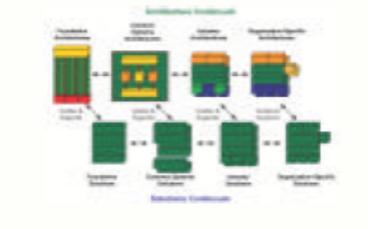




ADM Guidelines & Techniques



Enterprise Continuum



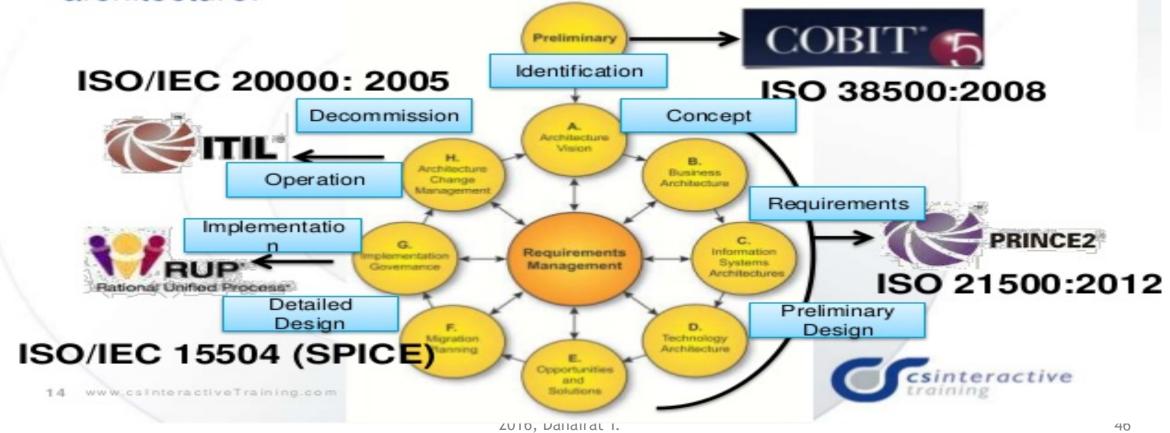
Architecture Capability Framework



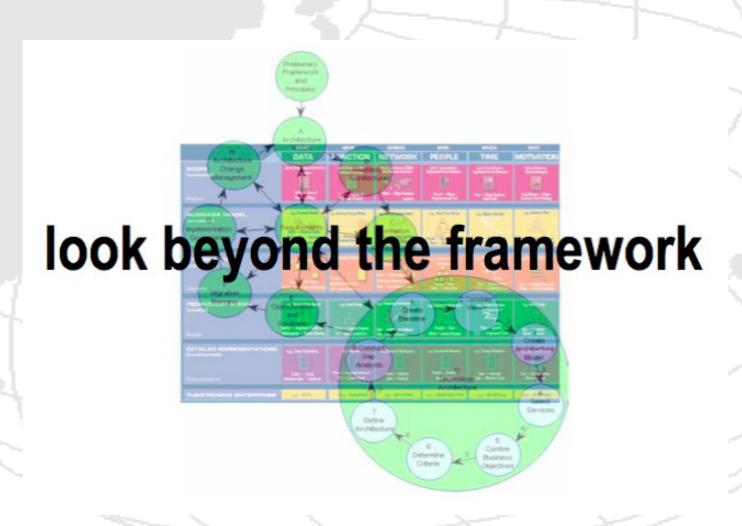
## TOGAF w. other management frameworks

#### The Open Group Architecture Framework (TOGAF) aligned with other management frameworks

The Architecture Development Method (ADM) is an iterative approach to planning, designing, realising, and governing the architecture.



# Which framework to use?



# CONTENT

- Enterprise Architecture over the age
- Enterprise Architecture Framework
  - Zachman
  - Togaf
- Enterprise Architecture reference model

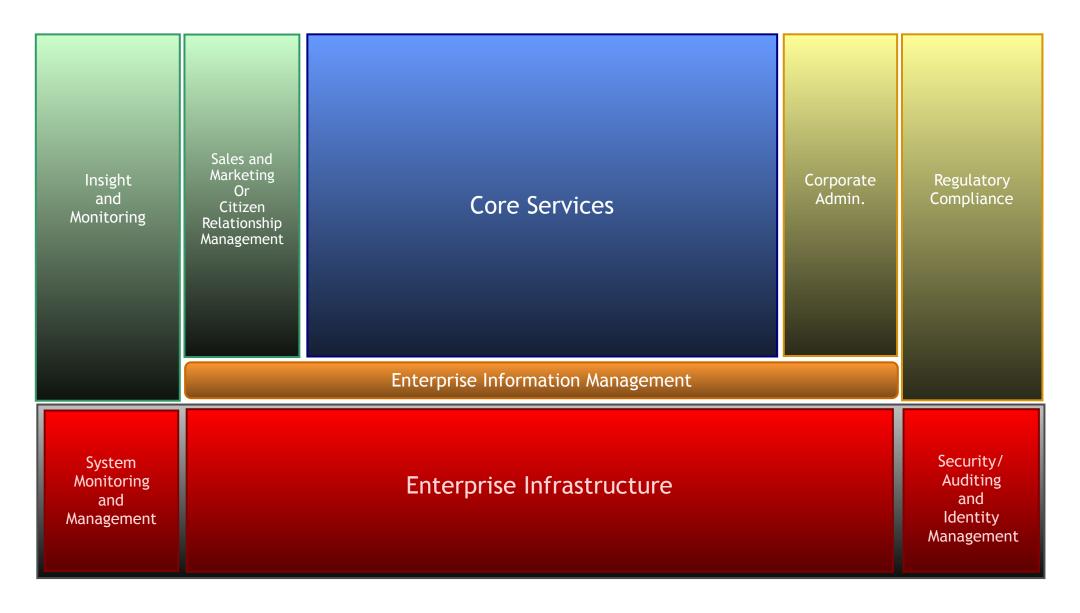


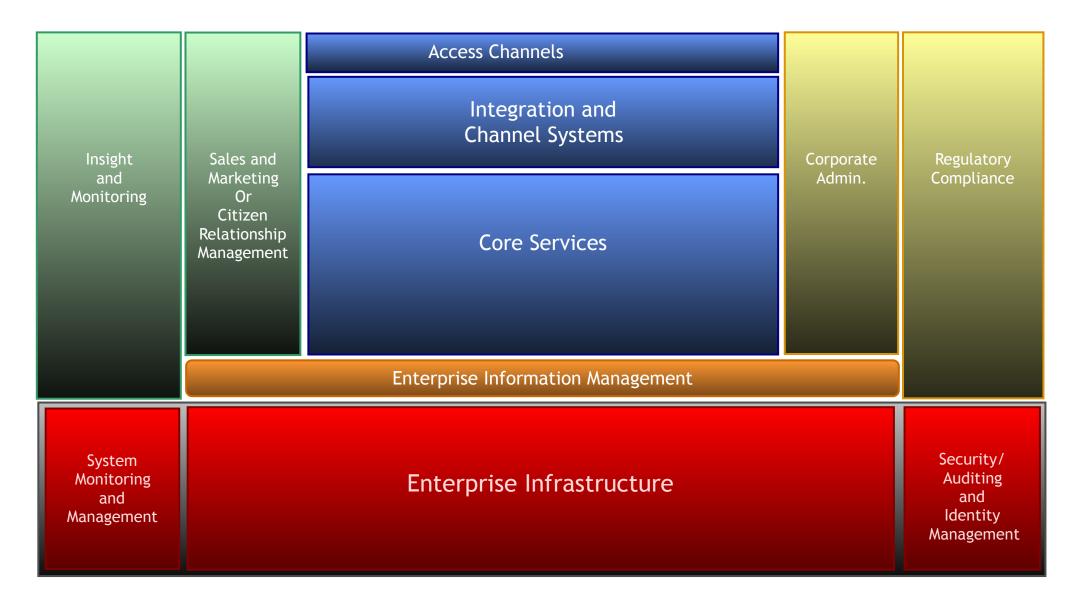
Core Services

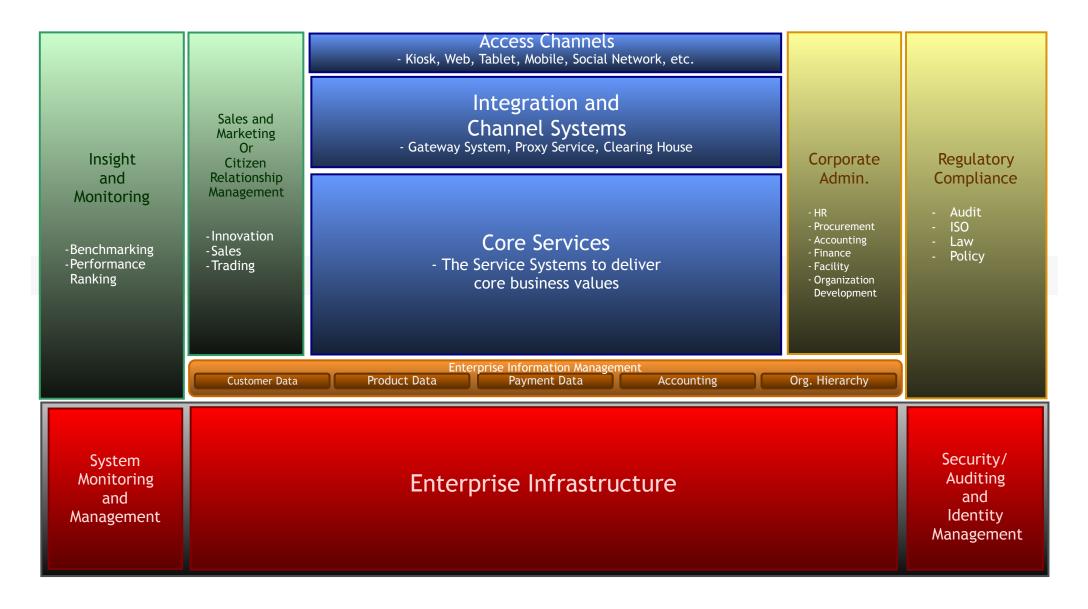
Enterprise Information Management

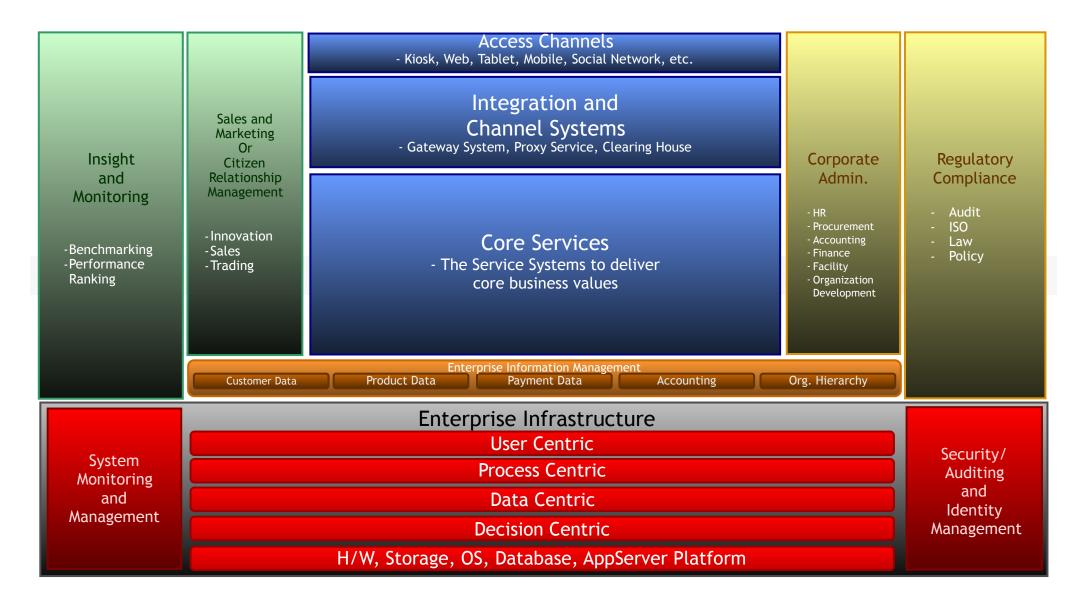




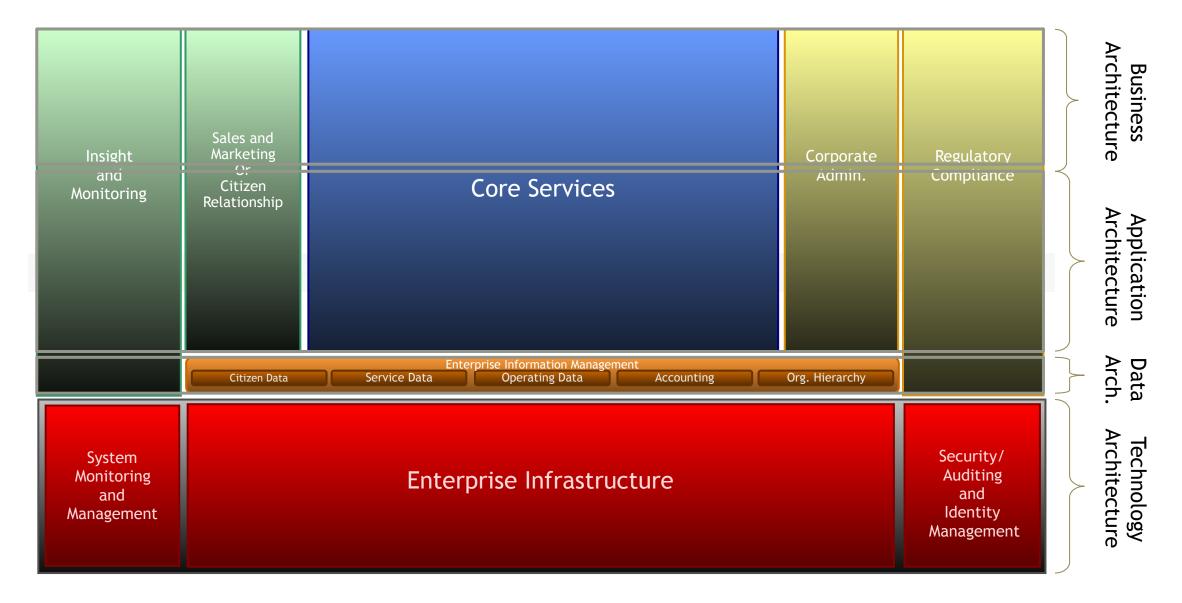




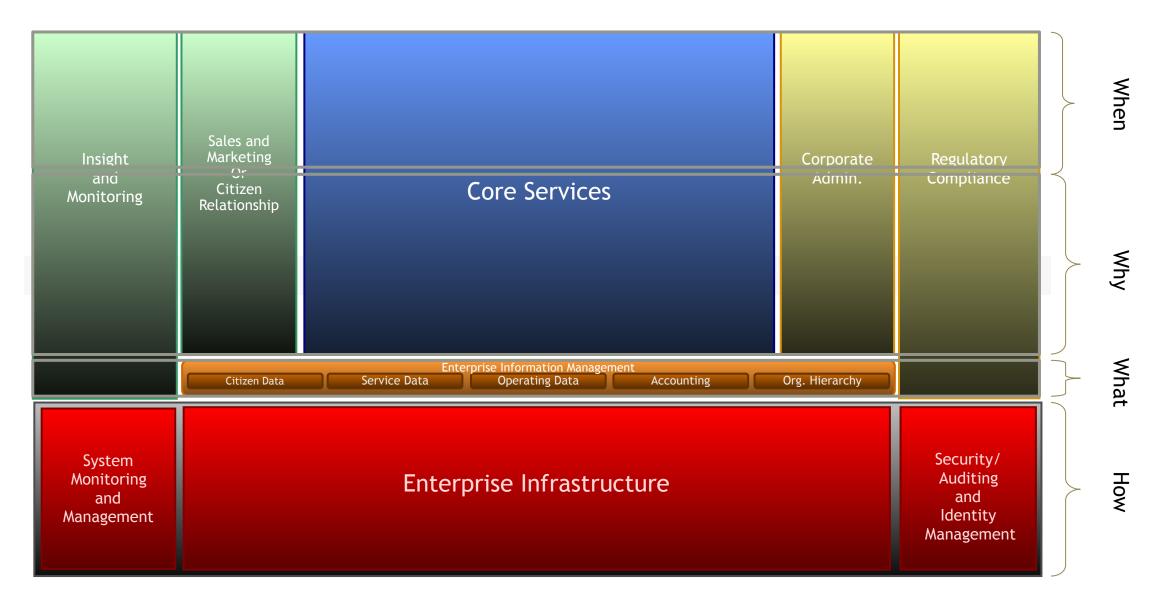




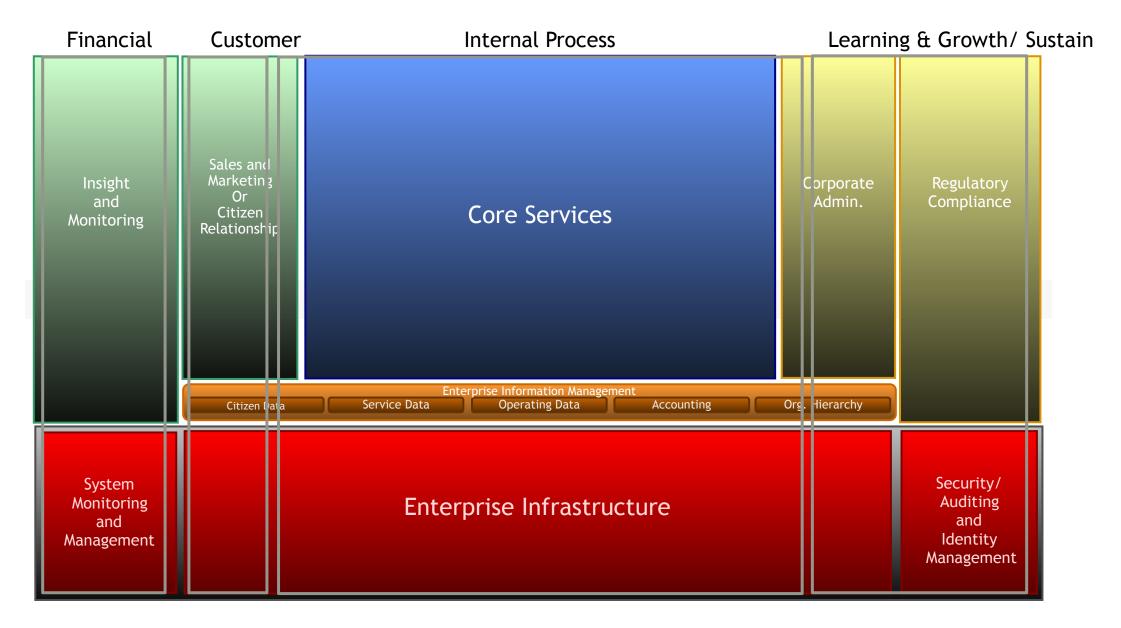
#### The Enterprise Reference Model with TOGAF



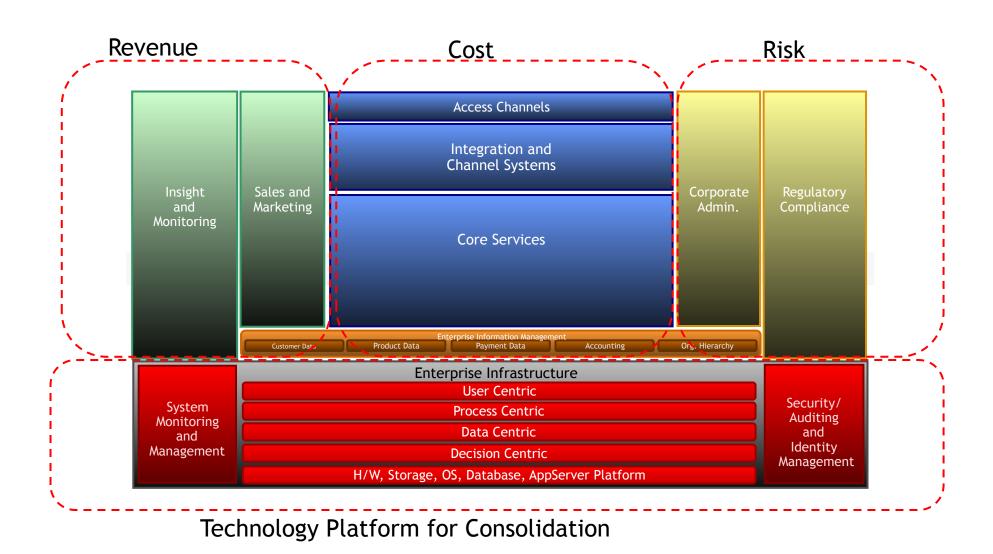
#### The Enterprise Reference Model with Zachman



#### The Enterprise Reference Model with Balanced Score Card



# The Enterprise Reference Model Three Pillars of Organization and Technology Platform

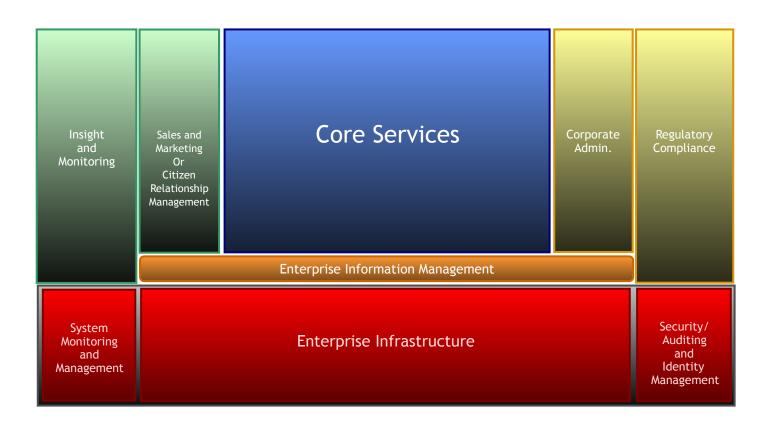


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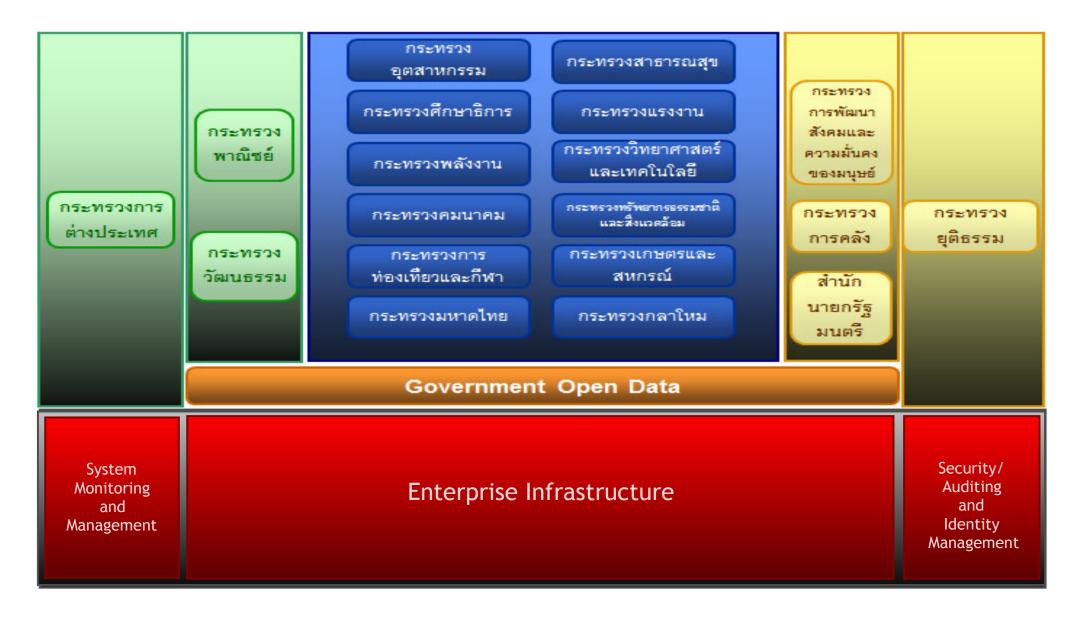
#### **Enterprise Reference Model (ERM)**

#### ERM ช่วยทำให้การมองภาพระหว่าง Business และ IT มีความสอดคล้องกัน

- 1. มองเห็นกระบวนการทำงานทางธุรกิจได้ อย่างครอบคลุมและเป็นระบบ
- 2. มองเห็นความสอดคล้องระหว่างธุรกิจ กับ IT ได้ในระดับ Strategic View
- 3. สามารถวางระบบ IT ให้สอดคล้องกับ ธุรกิจ
- 4. เป็นจุดเริ่มต้นของการทำรายละเอียดใน ขั้นตอนต่อไป



#### **Government Reference Model**



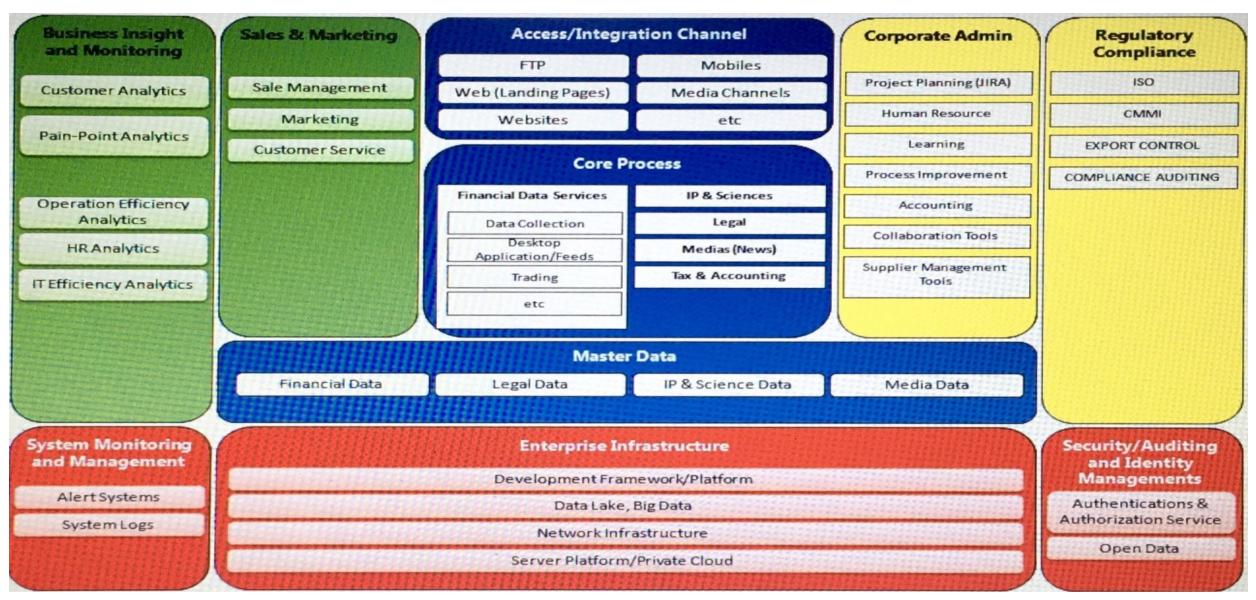
### Banking Reference Model Agite, Secure and Standard Platform



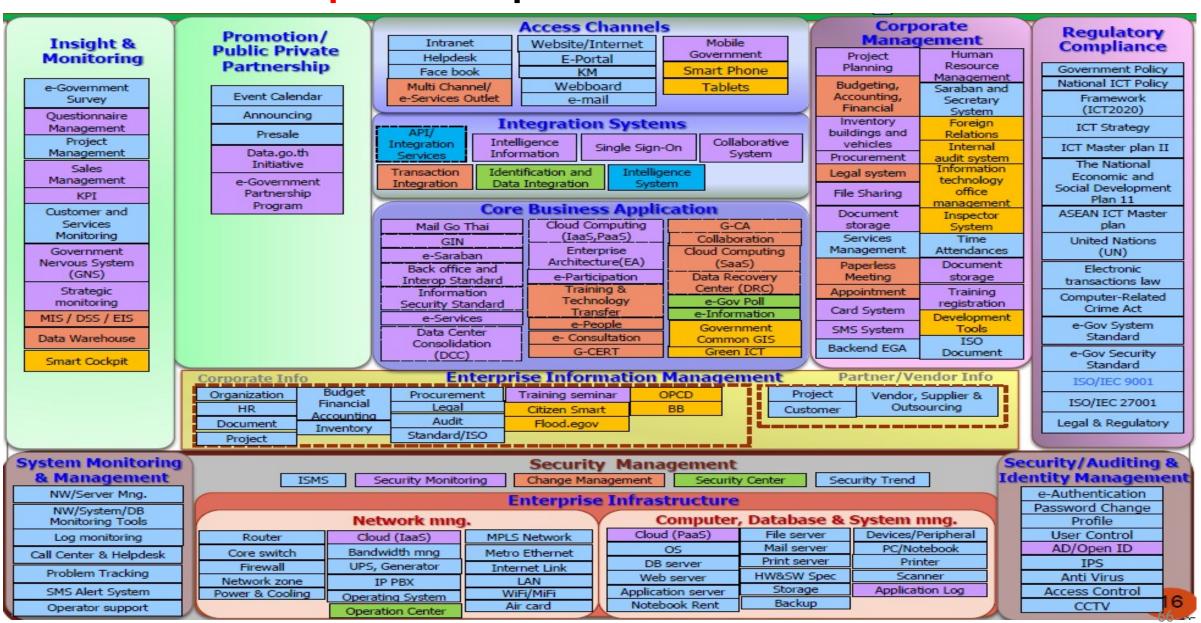
Aeronautical Enterprise Reference Model

#### Business Insight and Sale and Marketing **Access Channels** Corporate Regulatory Monitoring Administration Compliance HRM & HRD Internal Audit Performance Management Corporate Communication and Briefing Room Relation Management Policy & Strategy Services Standards **Core Business** Finance Safety Management **Business Development** Aeronautical Information Service and Aeronautical Charts Procurement & Inventory Risk Management ΙT Flight Inspection Air Traffic Service Aircraft Operation Test Equipment Calibration Aeronautical Communication, Navigation and Surveillance System/Service Legal Affairs & Secretary **Related Services** Facilities Administration **Enterprise Information Management Employee Data** Flight Data Organization Data Project Data Strategic Data Procurement Data Accounting Data **Customer Data** System Monitoring and Security/Auditing and Enterprise Infrastructure Management **Identity Management** Software Development Life Network Monitor & Management Office Automation **IT Services SAN Storage** Information Security Cycle (SDLC) Management System Log Capture Modern Network Server Monitor & Management Access Control **RDBMS** Wireless Network **Network Security** Storage Monitor & Management Virtualization **Identity Management** Server Blade

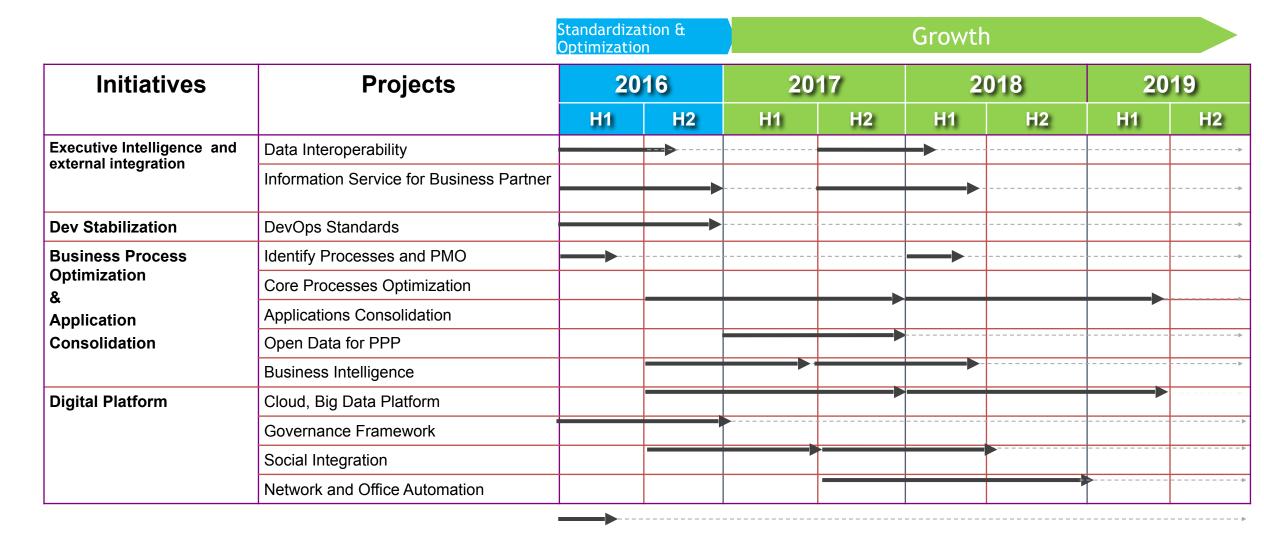
# **Trading Enterprise Reference Model**



# Sample Enterprise Reference Model 155 157 Future

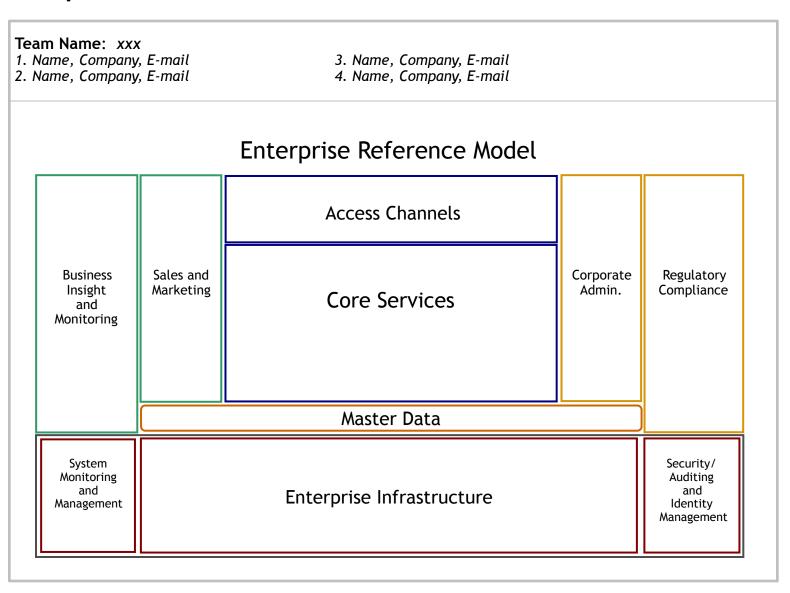


#### Digital Transformation Master Plan



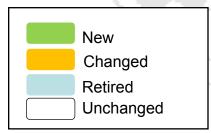
#### Group Workshop - The Current State Enterprise Reference Model

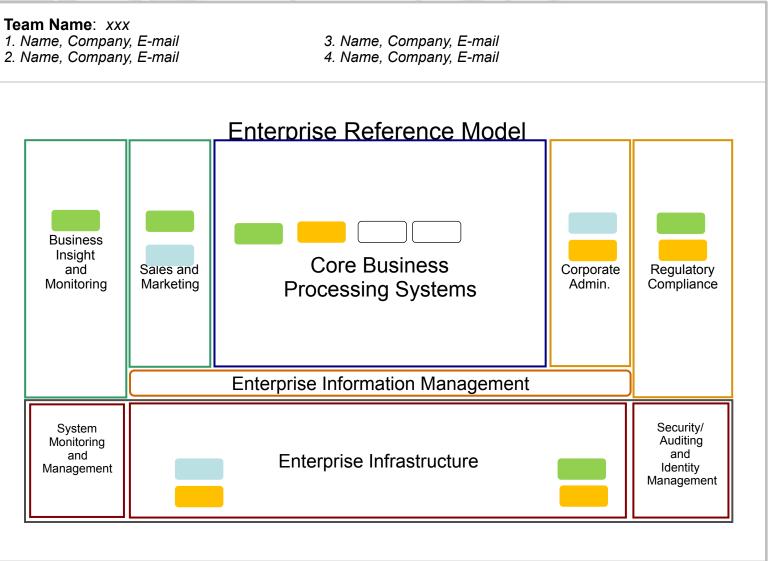
Write down your existing enterprise architecture foot print



#### Group Workshop - The Future State Enterprise Reference Model

Write down your future state





#### Enterprise Architecture Repository Owner: Business Units

#### **Business Objectives**

#	Business Goals	Business Objectives	Owner	<b>Business Services</b>	Business Processes	Remarks
						2 3 7 10

#### **Business Processes**

#	Business Process Name	Owner	Strategic Business Process (Y/N)	Main Service Description	Core Processing,	(Please attach up-to-date	Actual Transaction Complete Duration (hr,day,week)	Total of Transaction / year		Supported by Application(s)	Current Issues	Remarks
									4			
1												

# **Enterprise Architecture Repository**

Owner: Technology Unit

**Applications** 

#	Application Name	High Level Application Flow with User (SOD) Roles Partitioning (please attach up-to-date document)	Application Integration Details (Online/Batch) to which systems	Data Required	Current Issues	Remarks

Owner: Business Unit

#	Master Data Name	Owner	Description	Change Control of master data (Y/N)	Sample of data structure if any	Current Issues	Ramarks

# **Enterprise Architecture Repository**

#### Technology

#	Application Name	Users/Concurr	Application Software Language	Application Operating System	Application OS Virtualization (Y/N) if yes, please provide product name	Single sign-on (Y/N) if yes, please provide	Dashboard Portal (Y/N) if yes, please provide	Application Availability Monitoring Tool (Y/N) if yes, please provide product name	% of Application system growth / year	Database Vendor- Version	Operating	Database OS Virtualization (Y/N) if yes, please provide product name	system growth	Database System Maintainance Cost / year

# Thank you very much