

A dark tablet with a white Apple Pencil resting on a wooden surface. The tablet is positioned diagonally, and the pencil is lying horizontally next to it. The background is a light-colored wooden surface with a visible grain. The text is overlaid on the left side of the image.

**Enterprise
Computing**
EMIT-607

Session 4

Part A and B

Session Outlines:

Part A: The CSVLOD Model of Enterprise Architecture

- Dimensions for Classifying Enterprise Architecture Artifacts
- Six General Types of Enterprise Architecture Artifacts
- The Resulting CSVLOD Model of Enterprise Architecture

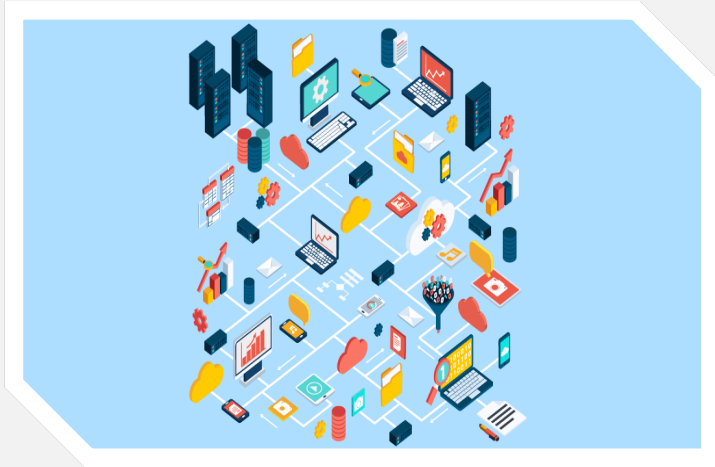
Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Considerations
- Standards as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Standards

Part C: EA Visions and Landscapes

- Visions as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Visions
- Landscapes as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Landscapes

Part A: The CSVLOD Model of Enterprise Architecture



- Dimensions for Classifying Enterprise Architecture Artifacts
- Six General Types of Enterprise Architecture Artifacts
- The Resulting CSVLOD Model of Enterprise Architecture

Part A: The CSVLOD Model of Enterprise Architecture

- **Dimensions for Classifying Enterprise Architecture Artifacts**
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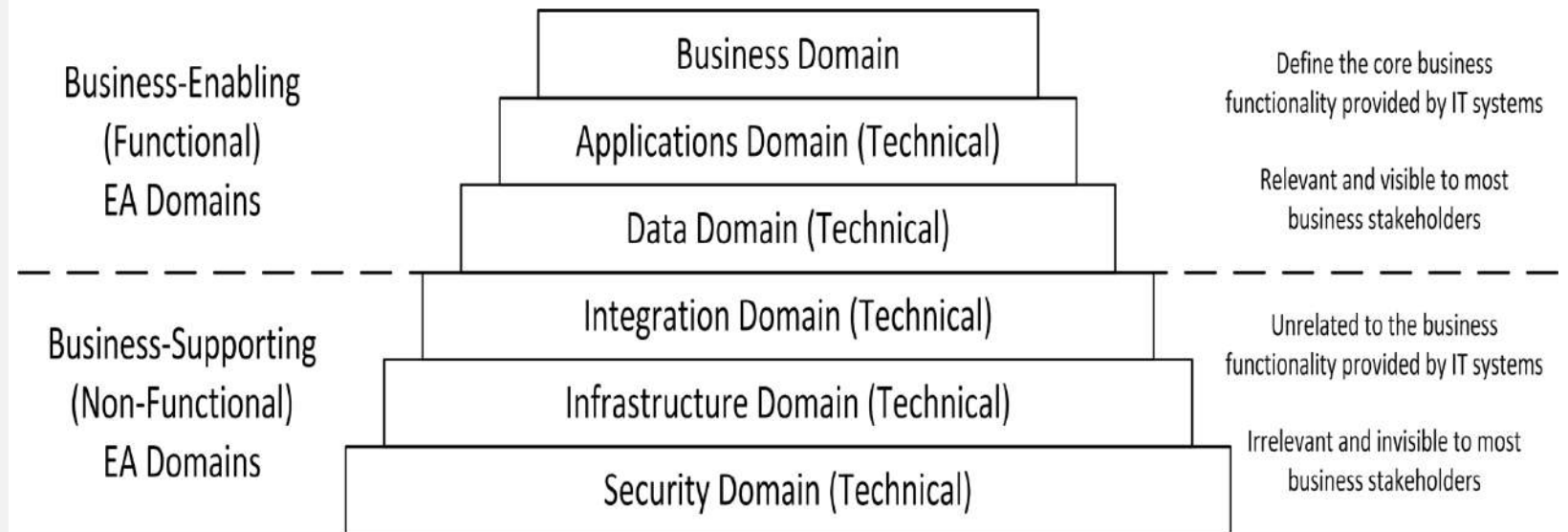
Introduction:

- Previously, we presented the CSVLOD model which conceptualizes the notion of enterprise architecture as a set of six general types of EA artifacts:
 1. Considerations (e.g. principles and policies).
 2. Standards (e.g. technology reference models and guidelines).
 3. Visions (e.g. business capability models and roadmaps).
 4. Landscapes (e.g. landscape diagrams and inventories).
 5. Outlines (e.g. solution overviews and options assessments).
 6. Designs (e.g. various solution designs).

Part A: The CSVLOD Model of Enterprise Architecture

- The Resulting CSVLOD Model of Enterprise Architecture
- **Dimensions for Classifying Enterprise Architecture Artifacts**
- Six General Types of Enterprise Architecture Artifacts

The Stack of EA Domains:

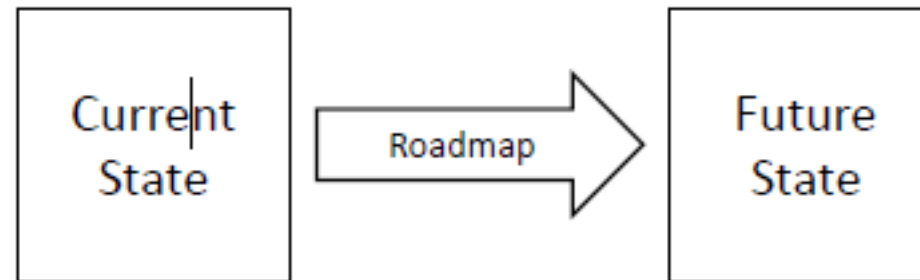


Part A: The CSVLOD Model of Enterprise Architecture

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EA as Two States and Roadmap

- Enterprise architecture consists of three components:
- Current (baseline, as-is, existing, etc.) state
- Future (target, to-be, desired, etc.) state
- Roadmap (or transition plan)



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CSVLOD Model

- The CSVLOD model is a novel conceptualization of enterprise architecture from scratch that:
- Emerged from research, not from marketing
- Supported by evidence from real organizations
- Reflects genuine industry EA best practices
- Accurately describes empirical realities of EA
- Fills the critical gap in the EA discipline

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Dimensions will help better understand the general properties of different types of EA artifacts

Dimensions for Classifying EA Artifacts

- The key element of the CSVLOD model is the taxonomy for EA artifacts
- The **first dimension** classifies all EA artifacts into **rules, structures and changes**
- The **second dimension** classifies all EA artifacts into **business-focused and IT-focused**

Part A: The CSVLOD Model of Enterprise Architecture

- Dimensions for Classifying Enterprise Architecture Artifacts
 - Dimension one “What”
 - Dimension two “how”
- Six General Types of Enterprise Architecture Artifacts
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Dimension One: What?

- Classifies EA artifacts based on [what objects they describe](#)
- All EA artifacts can be classified into:
 - **Rules** - describe broad global rules defining an organization or its divisions
 - **Structures** - describe high-level structures of an organization or its parts
 - **Changes** - describe specific proposed incremental changes to an organization

Part A: The CSVLOD Model of Enterprise Architecture

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Dimension One: What?

Rules EA artifacts describe general global *rules* defining an organization or its divisions. They are often represented in textual formats.

Rules typically apply to all instances of a certain type

For example, rules may define:

- how all business processes in an organization should be run or
- how all information systems in its IT landscape should be implemented.

Rules are **permanent EA artifacts** (see Table 2.2), which are usually **created once and then periodically updated**. They are the most **stable and infrequently changing** EA artifacts.

These **artifacts provide the basis for all other planning decisions** and usually answer the following question: “How do we work or want to work?”

For instance, rules may prescribe to install Linux operating systems on all servers, but at the same time there might be zero, one, 50 or 1000 Linux-based servers actually running in an organization.

The general purpose of all rules EA artifacts is to help achieve consistency and homogeneity of all planning decisions and approaches used in an organization

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Dimension One: What?

Structures EA artifacts describe high-level *structures* of an organization or its parts.

They are usually represented in graphical formats. Unlike rules.

Structures refer to specific but abstract instances and often describe the relationship between different instances.

For example, structures may describe

- how different IT systems relate to specific business capabilities or
- how these systems are connected to each other.

Structures are permanent EA artifacts, which are usually created once and then continuously updated.

They are relatively stable, but change together with an organization and its plans.

These artifacts provide high-level “maps” facilitating decision-making and usually answer the following question: “What approximately do we have or want to have?”

Structures are typically tangible and countable since they describe specific instances and their relationship.

The general purpose of all structures EA artifacts is to help understand what changes are desirable in an organization and how to implement them.

Part A: The CSVLOD Model of Enterprise Architecture

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Dimension One: What?

Changes EA artifacts describe specific proposed incremental *changes* to an organization, i.e. separate change initiatives or projects

They are usually represented in mixed textual and graphical formats

Unlike structures, changes thoroughly describe concrete instances with their internal details, e.g. separate process steps, system components, functional specifications, data objects and communication interfaces.

For example, changes may describe

- how exactly a new IT system needs to be implemented
- how exactly this system will modify particular business processes.

Changes are **temporary EA artifacts**, which are usually created for specific purposes and then discarded

Changes represent tactical plans of an organization and usually answer the question “What exactly are we going to change right now?”

The purpose of all changes is to help plan separate organizational changes in detail

Part A: The CSVLOD Model of Enterprise Architecture

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| Artifacts | Permanent EA artifacts | Temporary EA artifacts |
|-----------|--|--|
| Scope | Broad scope, beyond specific IT initiatives | Narrow scope, limited to specific IT initiatives |
| Lifespan | Long-lived, often exist for years | Short-lived, exist for months or even weeks |
| Usage | Created once, periodically updated, constantly used and occasionally discarded | Created for particular purposes, used as intended and then immediately discarded |

Table 2.2. Permanent and temporary EA artifacts

Part A: The CSVLOD Model of Enterprise Architecture

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Rules, Structures and Changes

| Artifacts | Rules | Structures | Changes |
|-----------|--|--|---|
| Describe | Broad global rules defining an organization or its divisions | High-level structures of an organization or its parts | Specific proposed incremental changes to an organization |
| Scope | Very wide, often cover an entire organization | Wide, often cover large parts of an organization | Narrow, limited to separate IT initiatives or projects |
| Format | Often textual | Usually graphical | Mix of textual and graphical |
| Question | How do we work or want to work? | What approximately do we have or want to have? | What exactly are we going to change right now? |
| Lifecycle | Permanent, created once and then periodically updated | Permanent, created once and then continuously updated | Temporary, created for specific purposes and then discarded |
| Role | Basis for all other planning decisions | High-level “maps” facilitating decision-making | Tactical plans of an organization |
| Purpose | Help achieve consistency and homogeneity of all planning decisions | Help understand what changes are desirable and how to implement them | Help plan separate changes in detail |

Part A: The CSVLOD Model of Enterprise Architecture

- Dimensions for Classifying Enterprise Architecture Artifacts

- Dimension one “What”
- **Dimension two “how”**
 - Business-focused
 - IT-focused

- Six General Types of Enterprise Architecture Artifacts

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Dimension Two: How?

- Classifies EA artifacts based on *how they describe objects*
- All EA artifacts can be classified into:
 - **Business-focused** - tend to be technology-neutral and use business language (e.g. money, customers, capabilities, business goals, competitive advantages, etc.)
 - **IT-focused** - tend to be purely technical and use IT-specific language (systems, applications, databases, platforms, networks, etc.)

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Dimension Two: How?

Business-focused - tend to be technology-neutral and use plain business language (e.g. money, customers, capabilities, business goals, competitive advantages, etc.)

- They tend to be brief, largely informal, use highly intuitive formats and contain only the most essential information
- Business-focused EA artifacts are intended largely for business executives and always dual EA artifacts
 - aiming to facilitate effective collaboration and partnership between business and IT stakeholders
 - Fig. 2.5
- Essentially, these EA artifacts can be considered as communication “interfaces” between business and IT
- All business-focused EA artifacts are either developed collaboratively by architects and business executives, or at least consciously approved by business leaders
- The purpose of all business-focused EA artifacts is to **help business leaders manage IT without understanding its technical details**

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Dimension Two: How?

IT-focused EA artifacts tend to be purely technical and use highly IT-specific language. e.g. systems, applications, databases, platforms and networks

These artifacts typically cover various technical EA domains (e.g. applications, data, integration, infrastructure and security, see Figure 2.3) and sometimes the business domain as well (e.g. specific business processes or requirements).

Unlike business-focused EA artifacts, they can be more formal, voluminous and detailed to provide all the relevant implementation-specific information, sometimes using specialized and sophisticated

Essentially, these artifacts can be viewed as internal IT tools invisible to business.

All IT-focused EA artifacts are developed predominantly by architects with the involvement of other IT stakeholders when necessary.

The purpose of all IT- focused EA artifacts is to **help architects organize IT according to their best understanding of the business interests.**

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Business- and IT-Focused EA Artifacts

| Artifacts | Business-focused | IT-focused |
|--------------|--|---|
| Language | Technology-neutral business language | Technical IT-specific language |
| Domains | Business domain and often other relevant domains at a high level | Applications, data, integration, infrastructure, security domains and sometimes business domain |
| Format | Brief, intuitive, largely informal and include only the most essential information | Can be voluminous, formal, use strict notations and include comprehensive details |
| Stakeholders | Business leaders and architects | Architects and other IT specialists |
| Role | Communication interfaces between business and IT | Internal IT tools invisible to business |
| Purpose | Help business leaders manage IT | Help architects organize IT |

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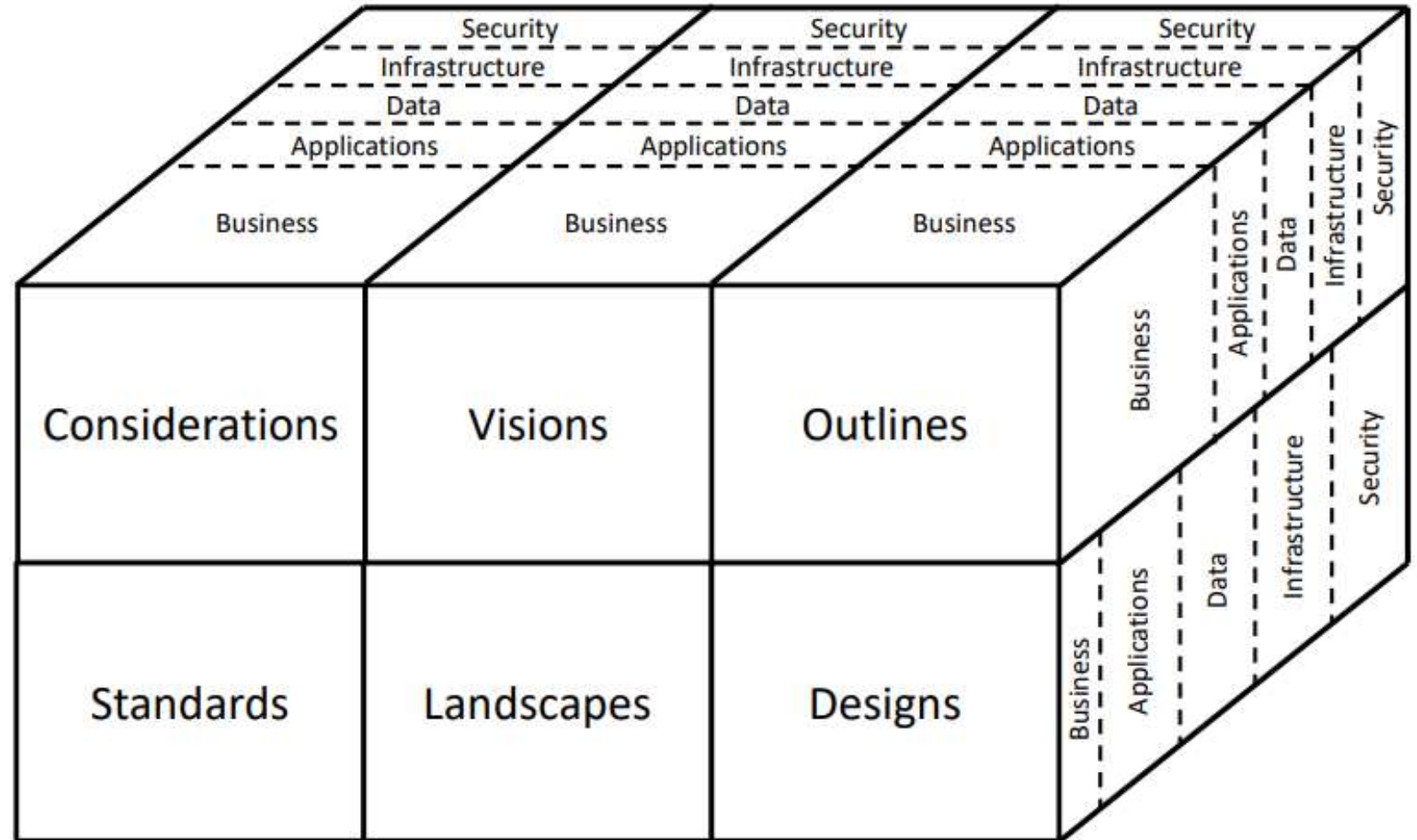
| | | What Artifacts Describe? | | | How Artifacts Describe? |
|------------------|--|--|---|---|-------------------------|
| | | Rules | Structures | Changes | |
| Business-Focused | | Considerations (Business-Focused Rules) | Visions (Business-Focused Structures) | Outlines (Business-Focused Changes) | |
| | | Language: Technology-neutral business language Domains: Business domain and often other relevant domains at a high level Format: Brief, intuitive, largely informal and include only the most essential information Stakeholders: Business leaders and architects Role: Communication interfaces between business and IT Purpose: Help business leaders manage IT | | | IT-Focused |
| IT-Focused | | Standards (IT-Focused Rules) | Landscapes (IT-Focused Structures) | Designs (IT-Focused Changes) | |
| | | Language: Technical IT-specific language Domains: Various technical domains and sometimes also business domain Format: Can be voluminous, formal, use strict notations and include comprehensive details Stakeholders: Architects and other IT specialists Role: Internal IT tools invisible to business Purpose: Help architects organize IT | | | |
| | | Describe: General global rules defining an organization or its divisions Scope: Very broad, often relate to an entire organization Format: Often textual Question: How do we work or want to work? Lifecycle: Created once and then periodically updated Role: Basis for all other planning decisions Purpose: Help achieve consistency and homogeneity | Describe: High-level structures of an organization or its parts Scope: Broad, often cover large areas of an organization Format: Usually graphical Question: What approximately do we have or want to have? Lifecycle: Created once and then continuously updated Role: High-level "maps" facilitating decision-making Purpose: Help understand what changes are desirable and how to implement them | Describe: Specific proposed changes to an organization Scope: Narrow, limited to separate IT initiatives or projects Format: Mix of textual and graphical Question: What exactly are we going to change right now? Lifecycle: Created for specific purposes and then discarded Role: Tactical plans of an organization Purpose: Help plan separate changes in detail | |

Figure 8.1. The CSVLOD taxonomy for EA artifacts

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CSVLOD Model of EA



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General Types and Narrow Subtypes

- Each general type represents a broad variety of different EA artifacts with similar properties and purposes
- However, for each general type there is a limited set of widely used narrow subtypes of EA artifacts
- All subtypes of EA artifacts can be grouped into three categories based on their relative popularity:
 - **Essential EA artifacts** - used in the majority of EA practices
 - **Common EA artifacts** - used in ~25-50% of EA practices
 - **Uncommon EA artifacts** - used in approximately ~10-25% of EA practices
- These subtypes of EA artifacts are often used under different titles in different organizations

Take a Break!

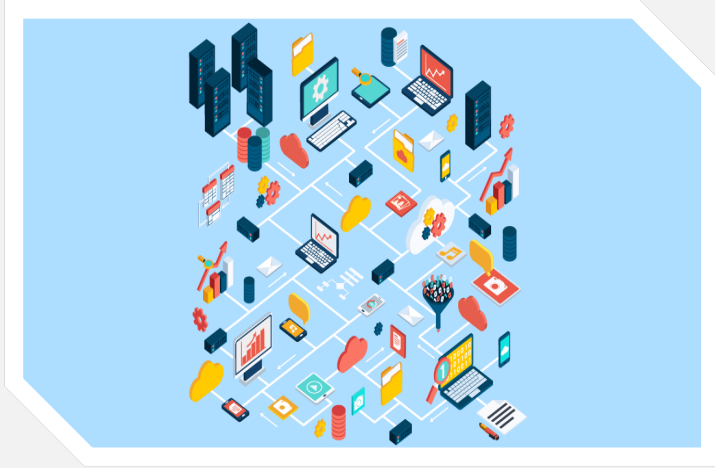

BREAK
Time

**Break
time**

**BREAK
TIME**



Part B: EA Considerations and Standards



- Considerations as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Considerations
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Considerations as an EA Artifact

- Considerations describe global conceptual rules and considerations important for business and relevant for IT
- Considerations represent planning decisions on how an organization needs to work from the IT perspective
- They are developed collaboratively by senior business executives and architects and then used to influence all “downstream” architectural decisions
- The purpose of all Considerations is to help achieve the agreement on basic principles, values and aims
- The proper use of Considerations leads to improved overall conceptual consistency between business and IT

Part B: EA Considerations and Standards

- **Considerations as a General Type of Enterprise Architecture Artifacts**
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- **Standards as a General Type of Enterprise Architecture Artifacts**
- **Specific Enterprise Architecture Artifacts Related to Standards**

Considerations as an EA Artifact Examples

- **Principles (essential)** – global high-level guidelines influencing all decision- making and planning in an organization
- **Policies (common)** – overarching organizational norms typically of a restrictive nature providing compulsory prescriptions in certain areas
- **Conceptual Data Models (uncommon)** – abstract definitions of the main data entities critical for the business of an organization and their relationship
- **Analytical Reports (uncommon)** – executive-level analyses of relevant technology trends and their potential impact on the business of an organization
- **Direction Statements (uncommon)** – conceptual messages communicating major organization-wide decisions with far-reaching consequences

Part B: EA Considerations and Standards

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Considerations as an EA Artifact Examples

- Principles (essential)
- Policies (common)
- Conceptual Data Models (uncommon)
- Analytical Reports (uncommon)
- Direction Statements (uncommon)

Part B: EA Considerations and Standards

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Principles Artifacts [essential]

- **Principles** are specific Considerations defining global high-level guidelines influencing all decision-making and planning in an organization
- Principles are formulated as brief **written statements defining what is important for an organization**
- Principles are very abstract and can be interpreted broadly depending on the context
- Organizations usually establish ~10-20 guiding Principles agreed by senior business and IT leaders

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Principles (Schematic View)

| |
|--|
| Principle 1: Standardized Business Processes |
| Statement: |
| Rationale: |
| Implications: |
| Principle 2: Single Customer View |
| Statement: |
| Rationale: |
| Implications: |
| Principle 3: Business Continuity |
| Statement: |
| Rationale: |
| Implications: |

Statement توضيح provides a definition of the Principle
Rationale عرض لأسباب explains the justification of this Principle,
Implications describe its consequences

For example, for the Principle “Business Continuity”
its Statement may clarify that “Critical business operations should not be interrupted even in case of severe emergency”

its Rationale may explain that “Uninterrupted 24/7 business operations are required to provide flawless customer experience and establish the reputation of the most trusted service provider according to the business strategy”

while one of **its Implications** may prescribe that “All critical information systems and databases should have geographically

Example Principles

Principles

| Principle 1: Standardized business process | |
|--|---|
| Statement | Bupa offer induction training session for new employee in all departments |
| Rational | To reduce the error rate and increase the employee productivity by making sure employees are already trained and have a background of the work that will be done. |
| Implication | Improving employee knowledge aiming to reach the company goals efficiently and effectively. |
| Principle 2: single customers view | |
| Statement | Customers carrying Bupa's insurance will be offered the same services and treatments in any hospital. |
| Rational | Ensuring the best customer experience |
| Implication | Gaining the customer loyalty to reach the goal (serving over millions of lives) |
| Principle 3: Business Continuity | |
| Statement | Launching Bupa's portal to access and use business process remotely |
| Rational | To reduce cost waste and simplify business process and improve productivity |
| Implication | Alternative ways to manage business in case of pandemic and crisis. |

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Policies [common]

- **Policies** are specific Considerations defining overarching norms typically of a restrictive nature providing compulsory prescriptions in certain areas
- Policies can be considered as a common subtype of Considerations often found in EA practices
- They can be called security policies, cloud policies, access policies, etc.
- Policies are formulated **as textual descriptions usually specifying what an organization must or must not do**
- Policies are rather clear, unambiguous and **not a subject** of much debate, reinterpretation or controversy إعانة التفسير أو الجدل لا – يسمح
- Policies are more often used in organizations processing more sensitive types of data (e.g. financial and personal information) and operating in more regulated industries from the informational perspective (e.g. banking and healthcare).
- Policies are often represented as MS Word documents listing and describing relevant regulatory norms

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Policies (Schematic View)

| | | |
|----------|---------------------------|--|
| External | National Privacy Policies | Policy 1: Personal Data Must Be Stored Onshore Description: |
| | | Policy 2: Destroy Personal Data When Not Needed Description: |
| | Sarbanes-Oxley Policies | Policy 3: Log All Accesses to Accounting Systems Description: |
| | | Policy 4: Retain Audit Trails and Emails for 5 Years Description: |
| Internal | Data Security Policies | Policy 5: No Sensitive Data on Mobile Devices Description: |
| | | Policy 6: Store Credit Cards in Encrypted Formats Description: |
| | Data Exchange Policies | Policy 7: Do Not Share Key Data with Third Parties Description: |
| | | Policy 8: Share Client Data with Trusted Partners Description: |
| | Cloud Hosting Policies | Policy 9: Use Only the PCI DSS Compliant Cloud Description: |
| | | Policy 10: Do Not Store Health Data in the Cloud Description: |

- Policies act as limiting constraints of all IT-related decision-making processes
- strict and compulsory, deviations from them are often not discussable
- Adherence to Policies is often checked and ensured during the approval of other more specific EA artifacts

Example Policies

| | | |
|----------|---------------------------|---|
| External | National Privacy Policies | Policy 1: Data must be stored on premises cloud |
| | | Policy 2: Unused data can be destroyed after 5 years. |
| | Sarbanes-Oxley Policies | Policy 3: Log all access to Bupa's network Description: access and activity using Bupa's network is stored. |
| | | Policy 4: All Emails are archived / retrieved for 10 years. |
| Internal | Data Security Policy | Policy 5: External access has high constraint. Description: any external access (not Bupa's devices) is not allowed unless the user downloaded high security specific application on his devise. |
| | | Policy 6: Customers bank information encrypted Description: only specific people working on finance department have access to it. |
| | Data Exchange Policy | Policy 7: No data sharing with third party Description: No storage devices allowed, no cloud access, restricted rules for external emails |
| | | Policy 8: Information sharing to third party only thru authorized channel approved by cyber security team. |
| | Cloud hosting Policies | Policy 9: Use only the PCI DSS cloud after obtaining cyber security approval |
| | | Policy 10: all customer requests / records to be/ stored |

| | | |
|----------|-----------------------------|--|
| External | <u>Shipping policy</u> | Policy 1: Consignee is the person entitled to delivery of the cargo. Description: Once the AWB issued from the system shipper consignee and agent are assigned and information are checked once the shipment is delivered against the real person collecting the shipment. |
| | <u>National policy</u> | Policy 2: Shipper shall comply with all applicable laws and government regulations of any country to or from which the cargo may be carried that is issued from IATA. Description: Shipper shall furnish such information and attach such documents to the air waybill as may be necessary to comply with such laws and regulations. Carrier is not liable to shipper and shipper shall indemnify Carrier for loss or expense due to shipper's failure to comply with this provision. |
| Internal | <u>Data storing Policy</u> | Policy 3: Destroy employee data after 5 years of storing. Description: The limit for storing employee data who retired or quite is five years. After that, data must be destroyed. Policy 4: Destroy job submission data after 1 year. Description: Storing user submission for a job information for only 1 year. Then destroy it and the user can add their information again to submit. |
| | <u>Data exchange policy</u> | Policy 5: Share any internal data with third parties. Description: Any request by third party to gain access to any internal data requires NDA to be signed by both parties and any violation to the NDA will lead for legal discipline action. |

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Conceptual Data Models [uncommon]

- Conceptual Data Model is an abstract definitions of the **main data entities critical for the business of an organization and their relationship**
- Once developed, it will provide high-level data-focused rules shaping all architectural decisions related to data management
- Conceptual Data Models influence the logical design of all business applications, storage systems and integration platforms manipulating with data
- All IT systems should be compliant (accept) with the established Conceptual Data Models which is necessary for maintaining consistency of data
- Conceptual Data Models typically also provide the basis for developing more detailed, low-level and platform-specific Logical Data Models

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Conceptual Data Models [uncommon]

- Conceptual Data Models allow business executives to explicitly specify -
 - what information is important for the business, propose standard naming conventions and agree on the semantic meaning of core data entities,
- On the other hand, definitions of the critical information provided by Conceptual Data Models shape the design of all IT systems handling the corresponding data.
 - For example, if Conceptual Data Models define the customer data entity as a set of name, date of birth, location and phone properties, then every IT system capturing customer data should capture name, date of birth, location and phone properties, while all customer databases should store these properties in appropriate formats.
- Conceptual Data Models can improve the organization-wide consistency of data across all business units as well as facilitate effective data exchange between partner organizations.

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Conceptual Data Models [uncommon]

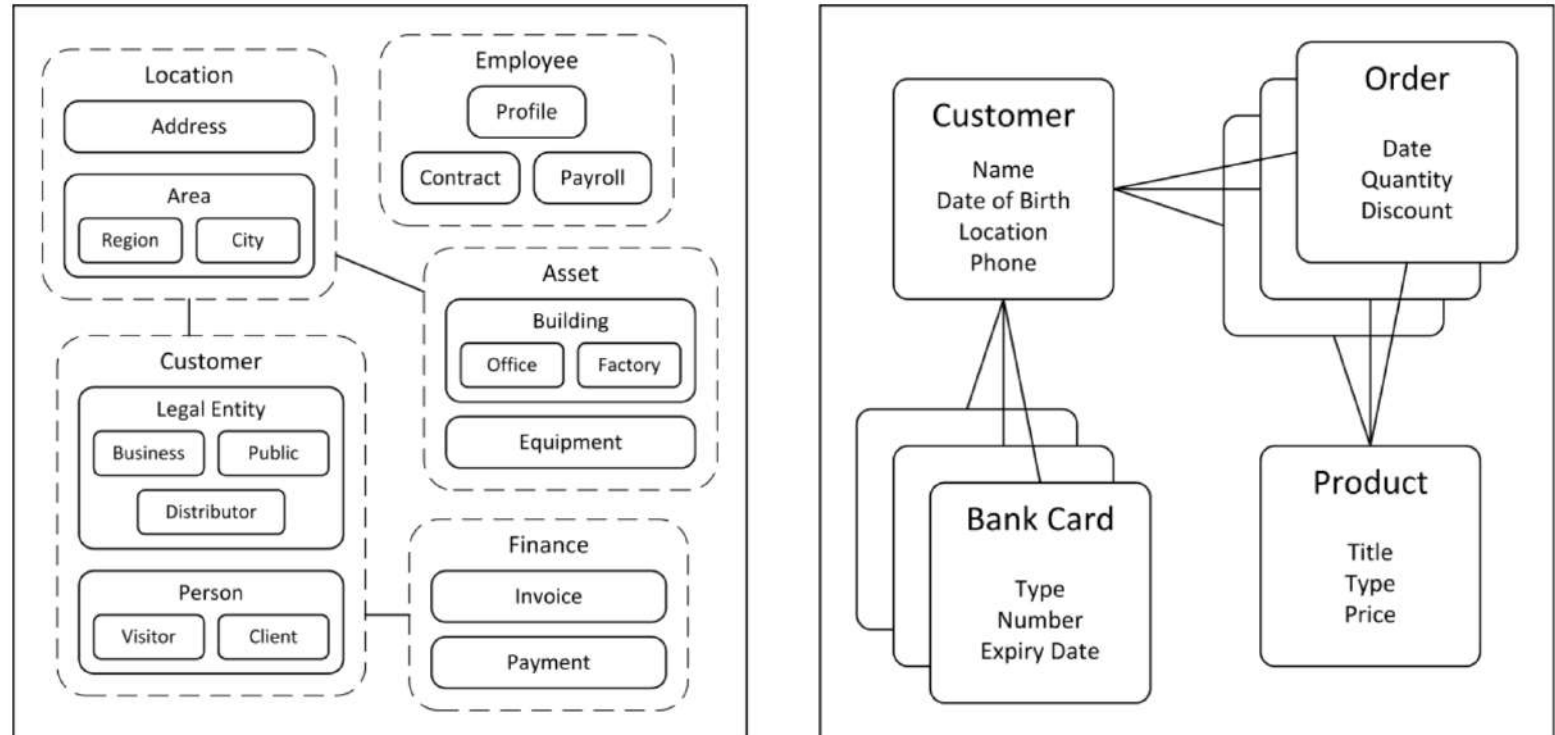
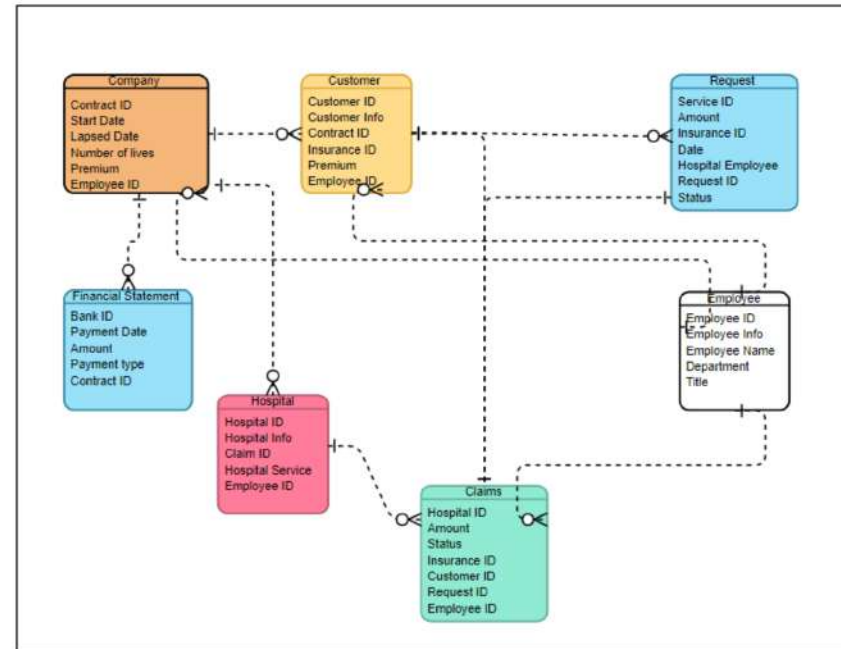
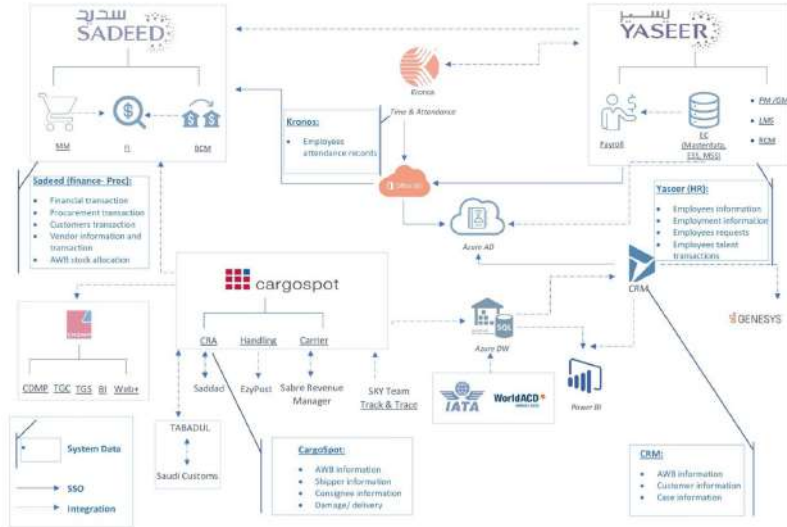


Figure 9.3. Conceptual Data Models (high-level models and low-level models)

Conceptual Data model



- Conceptual data model



Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
- **Specific Enterprise Architecture Artifacts Related to Considerations**
 - Principles (essential)
 - Policies (common)
 - Conceptual Data Models (uncommon)
 - **Analytical Reports (uncommon)**
 - Direction Statements (uncommon)
- Standards as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Standards

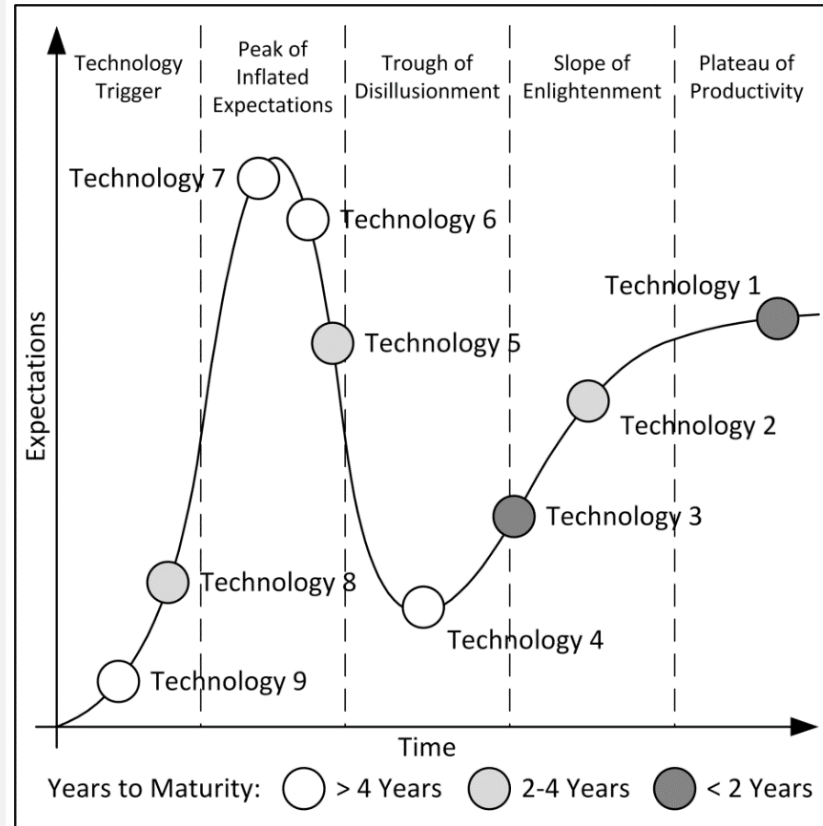
Analytical Reports [uncommon]

- Analytical Reports (can be called whitepapers, position papers, strategy papers, etc.)
- Are specific Considerations providing executive-level analyses of relevant technology trends and their potential impact on the business
- Analytical Reports can be considered as an uncommon subtype of Considerations used relatively rarely
- Analytical Reports reflect a business-oriented analysis of the organizational technology environment
- Analytical Reports describe the influence of technology trends as well as the desirable reaction on these trends
- Analytical Reports are more often developed in relatively large companies heavily dependent on IT.

Part B: EA Considerations and Standards

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Analytical Reports (Schematic View)



| | Helpful | Harmful |
|----------|------------------------------------|---------------------------------|
| Internal | Technology Strengths: _____ | Technology Weaknesses: _____ |
| | Strength 1: | Weakness 1: |
| | Strength 2: | Weakness 2: |
| | Strength 3: | Weakness 3: |
| External | Technology Opportunities: _____ | Technology Threats: _____ |
| | Opportunity 1: | Threat 1: |
| | Opportunity 2: | Threat 2: |
| | Opportunity 3: | Threat 3: |

Part B: EA Considerations and Standards

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Direction Statements [uncommon]

- **Direction Statements** are specific Considerations describing conceptual messages communicating major organization-wide decisions with profound impact (تأثير عميق)
- Direction Statements can be considered as an uncommon subtype of Considerations
- They can be called architecture strategies, governance papers, position papers, strategic papers, etc.
- Direction Statements **represent the results of strategic decision-making processes regarding the desired future direction of an organization or its major business units**
- تمثل بيانات الاتجاه نتائج عمليات اتخاذ القرار الاستراتيجي فيط يتعلق بالاتجاه المستقبلي المرغوب فيه لمنظمة أو وحدات أعمالها الرئيسية
- They can declare an organization-wide intention to go in a specific way, follow a particular approach, address a specific global need, do a certain thing or merely propose to leverage some new promising opportunity.
- For example, Direction Statements may articulate the desire of an organization to migrate all non-business-critical applications into the cloud, to consolidate all corporate information systems based on a single global ERP platform or, on the contrary, to develop custom IT systems tailored specifically for the unique needs of individual business units.

Part B: EA Considerations and Standards

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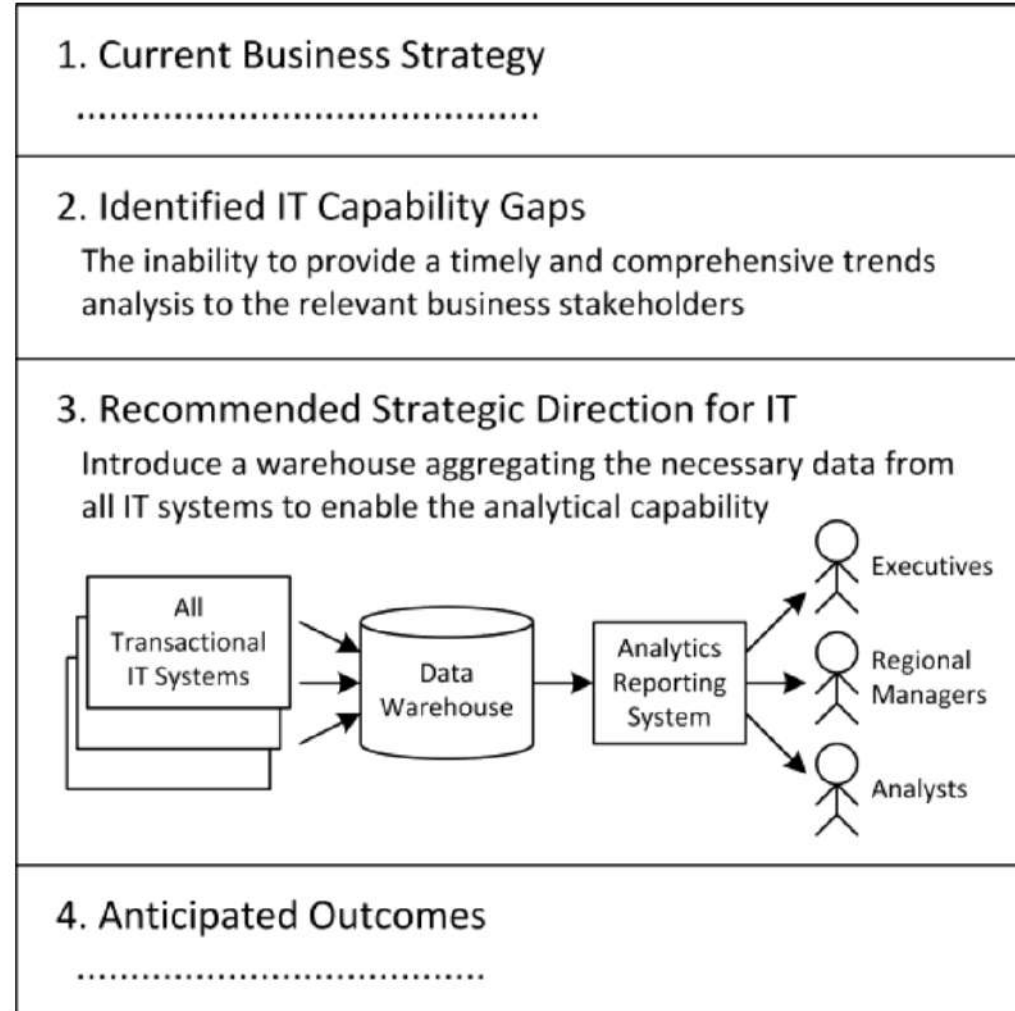
Direction Statements (Schematic View)

- Strategic imperatives provided by Direction Statements drive all subsequent decision-making processes
- Direction Statements are the most action-oriented EA artifacts of all Considerations.
 - While other Considerations merely describe how an organization needs to work or analyze the technology environment, **Direction Statements point to a certain direction where an organization needs to go in the future and explain the rationale for this direction.**
- Direction Statements only indicate where an entire company needs to go without specifying how.
- Direction Statements can be considered as EA artifacts complementary to Analytical Reports.
 - While Analytical Reports analyze the general positioning of an organization from the technology perspective,
 - Direction Statements propose high-level strategies for addressing the suggestions of Analytical Reports.
- Developing more specific Visions
- Direction Statements are often temporary EA artifacts with a limited lifespan

Part B: EA Considerations and Standards

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Direction Statements (Schematic View)



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Summary Artifacts Related to Considerations

- **Principles** are [essential Considerations](#) defining global high-level guidelines influencing all decision-making and helping business executives and architects agree on the most fundamental imperatives regarding the use of IT in an organization
- **Policies** are [common Considerations](#) defining overarching organizational norms and compulsory prescriptions of a restrictive nature and helping business leaders and architects agree on how an organization must not use its IT resources
- **Conceptual Data Models** are [uncommon Considerations](#) providing abstract definitions of the key data entities with their relationship and helping business leaders and architects achieve a shared understanding of the required structure of corporate data assets
- **Analytical Reports** are [uncommon Considerations](#) providing executive-level analyses of relevant technology trends and helping business leaders and architects develop a common attitude towards innovative and disruptive technologies
- **Direction Statements** are [uncommon Considerations](#) communicating major organization-wide planning decisions with far-reaching consequences and helping business executives and architects agree on the most general future course of action for business and IT
- Considerations in an EA practice is establishing trivial Considerations that only create an impression of planning and distract attention, but actually do not represent any real planning decisions

Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Considerations
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- Specific Enterprise Architecture Artifacts Related to Standards

Standards as EA Artifacts

- Standards are **IT-focused** rules EA artifacts, describe **global IT-specific rules**, **permanent** defined by **architects**
- Standards represent proven **reusable means** for IT systems implementation
- The general purpose of all Standards is to help achieve technical **consistency**, **technological homogeneity** and **regulatory compliance**
- Key organizational benefits of using Standards include:
 - Faster initiative delivery
 - Reduced costs
 - Mitigated risks
 - Lowered complexity
- Even though Standards are based on best business interests, they are developed exclusively by **architects and other senior IT experts** inside the IT department

Part B: EA Considerations and Standards

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Standards as EA Artifacts

- Standards define **how all IT systems in an organization are implemented from the technology perspective.**
- The implementation-level guidelines reflected in Standards address the following and similar technical questions:
 - What technologies and products should be used in IT solutions?
 - How exactly should the available technologies be used in IT solutions?
 - What implementation approaches should be followed in IT solutions?
 - What system components should be reused in IT solutions?
 - How should IT systems be organized and integrated?
 - What protocols should be used for the interaction between IT systems?
 - How should main data entities be stored in IT systems?

Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
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Standards as EA Artifacts Examples

- Technology Reference Models – essential EA artifacts
- Guidelines – essential EA artifacts
- Patterns – common EA artifacts
- IT Principles – common EA artifacts
- Logical Data Models – uncommon EA artifacts

Part B: EA Considerations and Standards

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Technology Reference Models [essential]

- **Technology Reference Models** are specific Standards providing **structured graphical representations** of all technologies used in an organization
- Technology Reference Models map all technologies and products used in an organization to the technical functions they fulfil or support
- It refers to **technology standards**, **technical reference models**, **technology reference architectures** or split into separate domain-specific reference models
- Technology Reference Models can be considered as an essential subtype of Standards found in the majority of successful EA practices.

Part B: EA Considerations and Standards

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Technology Reference Models [essential]

- Represent comprehensive views of the whole organizational technology stack.
- Basically, Technology Reference Models **structure and describe the technology portfolio of an entire organization.**
- Compliance with Technology Reference Models help architects select the most appropriate technologies for new IT solutions
- The mechanism of color-coding, i.e. marking technologies as deprecated, current or strategic, also helps architects manage the lifecycle of different technologies and optimize the entire technology portfolio
- **Technology Reference Models play especially important roles in organizations having significant in-house software development resources and producing their own custom applications and systems, rather than in organizations relying on standard commercial off-the-shelf (COTS) products supplied by external vendors.**
-

Part B: EA Considerations and Standards

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Technology Reference Models [essential]

- Basically, Technology Reference Models **structure and describe the technology portfolio of an entire organization.**
- Compliance with Technology Reference Models help architects select the most appropriate technologies for new IT solutions
- Technology Reference Models organize the technology stack into layers, e.g. networks, servers, databases, etc.
- Technology Reference Models are color-coded to indicate the status of different technologies, for example:
 - **Current** – up-to-date technologies and products currently in use
 - **Emerging** – cutting-edge technologies planned for adoption
 - **Unsupported** – outdated technologies that are currently in use
 - **Retiring** – legacy technologies planned to be retired

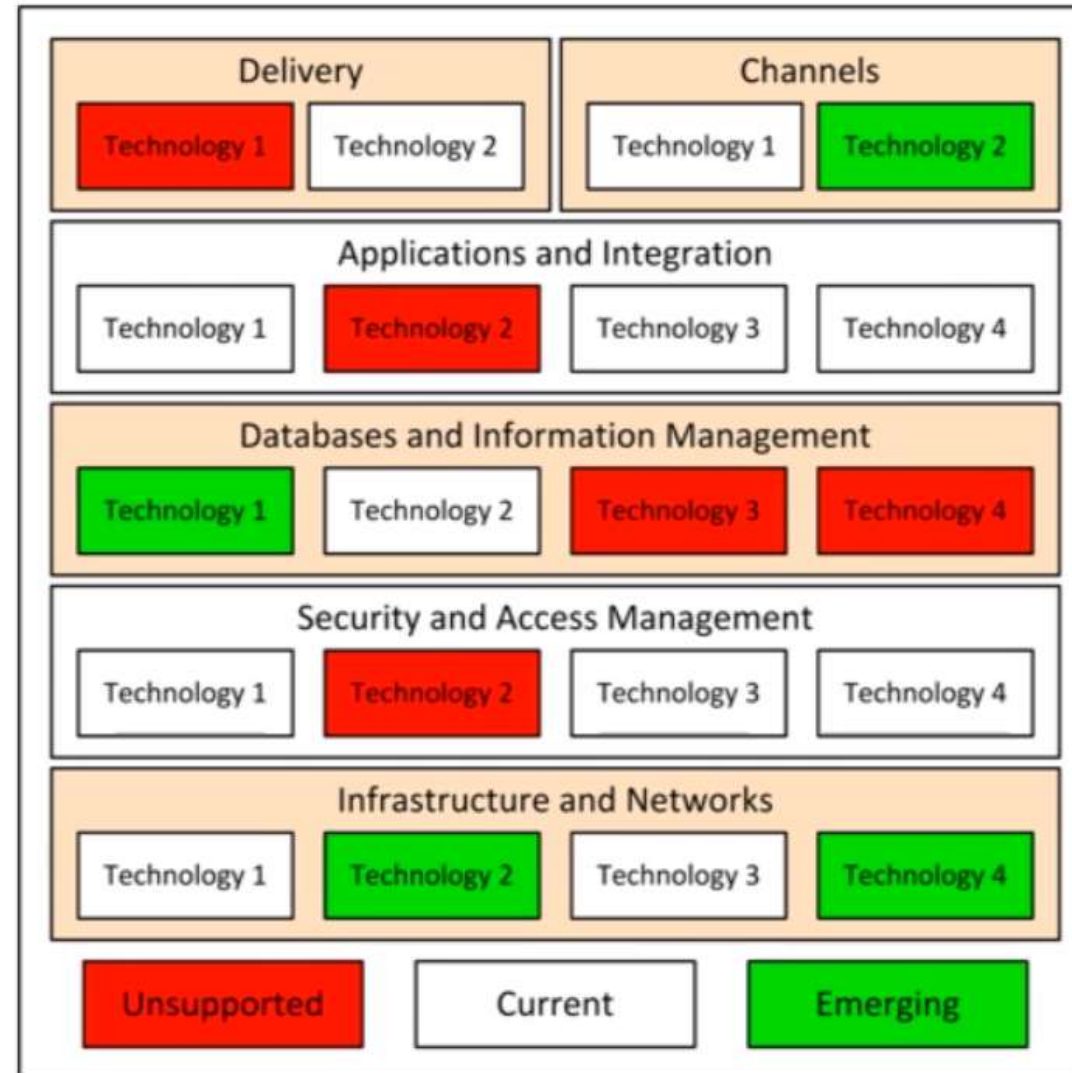
Technology Reference Models play especially important roles in organizations having significant **in-house software development** resources and producing their own custom applications and systems, **rather than in organizations relying on standard commercial off-the-shelf (COTS) products supplied by external vendors.**

•

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Technology Reference Models (Schematic View)



Example Technology Reference Model

- **Technology Reference Models**

| <u>Delivery</u> | | <u>Channel</u> | |
|--|------------------|------------------|----------------------|
| Office 365 | Dynamics 365 | Mobile App | Desktop App |
| CargoSpot | SAP S4/Hana | Web APP | |
| SAP Success factors | Power BI | | |
| Kronos | Genesys | | |
| Champ BI | AQD | | |
| <u>Application and integration</u> | | | |
| Cloud connector | Rest API | Boomi connectors | Standard connections |
| <u>Database and information management</u> | | | |
| Azure DWH | SAP cloud | MS shared cloud | Azure DB |
| <u>Security and access management</u> | | | |
| Azure SSO | Password policy | Trend micro | Azure security |
| <u>Infrastructure and network</u> | | | |
| Azure cloud | Azure on-prem AD | Azure VM | Network connectivity |
| Unsupported | Current | | Emerging |

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Guidelines [essential]

- **Guidelines** are usually grouped according to narrow **technology-specific domains** (e.g. network protocols, data encryption, server deployment, etc.) and maintained by relevant IT experts
- Guidelines are formulated as **brief written statements** providing actionable recommendations regarding the **usage of particular technologies in IT solutions**
 - e.g. “All data backups should be encrypted and password-protected to prevent unauthorized access”, “Each user request should be assigned a unique transaction ID to enable traceability” and “All interactions with external systems should be logged to monitor their SLAs”
- Guidelines are typically very concrete, unambiguous and **technical in nature**
- Guidelines focus mostly on the **internal structure of separate IT solutions**, rather than on the overall structure of the IT landscape
- Examples: how application deployed, protected, encryption, who access info, when to archive...

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Guidelines

Guidelines complement Technology Reference Models and are often used in conjunction with them.

Technology Reference Models only specify what technologies should be used in IT solutions,

Guidelines provide more detailed prescriptions specifying exactly how these technologies should be used.

Technology Reference Models, which may be used only by architects,

Guidelines are often relevant to both architects and IT project teams.

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Guidelines (Schematic View)

| | |
|-----------------------------|--|
| Server Deployment Standards | Guideline 1: Run Applications as OS Services Description: |
| | Guideline 2: Store Deployment Packages in VCS Description: |
| Network Protocol Standards | Guideline 3: Avoid Using UDP Multicast Description: |
| | Guideline 4: Prefer REST Over SOAP Description: |
| Data Encryption Standards | Guideline 5: Use 256-Bit Encryption Keys Description: |
| | Guideline 6: Store MD5 Hashes of Passwords Description: |
| Interface Design Guidelines | Guideline 7: Use Web-Safe Colours Description: |
| | Guideline 8: Place Menu in the Top Right Corner Description: |
| Secure Coding Guidelines | Guideline 9: Initialize Variables to Safe Defaults Description: |
| | Guideline 10: Validate All Incoming Data Description: |

Example Guidelines

- Guidelines

| | |
|----------------------------|---|
| Interface design guideline | Guideline 1: Place menu in the top middle. Description: the menu bar must be in the top middle for all the pages in CARGO website for easy access and enables navigation. |
| | Guideline 2: Use SACC SAL fonts and colors guidelines. Description: Marketing has specific guidelines and templets used for SACC SAL that has to apply to each systems. |
| Operating system standard | Guideline 3: Use Windows 10 or above. Description: Installing win10 for all computers in the company, which is the most recent version of software. Also, it is compatible with the most recent releases of newer version of the programs needed in the company. |
| e-mail guideline | Guideline 4: preventing out Description: prevent open option to open it with user |

| | |
|-----------------------------|---|
| Server deployment standards | Guideline 1: Launch new server with unreal data Description: New server must be tested for a period of time with unreal data and ensure everything is right before using it. |
| | Guideline 2: Server will not be used until its connected to a firewall Description: To ensure the security. |
| Network protocol standards | Guideline 3: No access to the network from external devices. Description: No one can access the network from external device unless its downloaded high security application |
| | Guideline 4: Prefer using Chrome Description: best performance with Bupa's application |
| Data encryption standards | Guideline 5: Use AES-128 encryption Description: Essential for electronic data protection |
| | Guideline 6: Use digital signature Description: To communicate with hospitals in safely manner. |
| Interface design standers | Guideline 7: Use the company identity colors Description: All website and application must be designed using Bupa's identity colors |
| | Guideline 8: Design user friendly interface with a lot icons and menu Description: To help customer navigate through the website easily |
| Secure coding guidelines | Guideline 9: Validate data entered Description: Check data validation first before storing in database |
| | Guideline 10: Code backup into the cloud Description: To prevent code loss |

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Patterns [common]

- **Patterns** are specific Standards providing generic **reusable solutions to commonly occurring problems** in the design of IT systems
- Patterns can be considered as a common subtype of Standards often found in successful EA practices
- They can be also called reference architectures
- Patterns represent **proven reusable components** for IT solutions addressing some common problems or needs
- Essentially, patterns offer complete logical “bricks” or building blocks from which new IT solutions can be constructed
- The same Patterns can be successfully reused in the design of multiple different IT solutions facing similar design problems.

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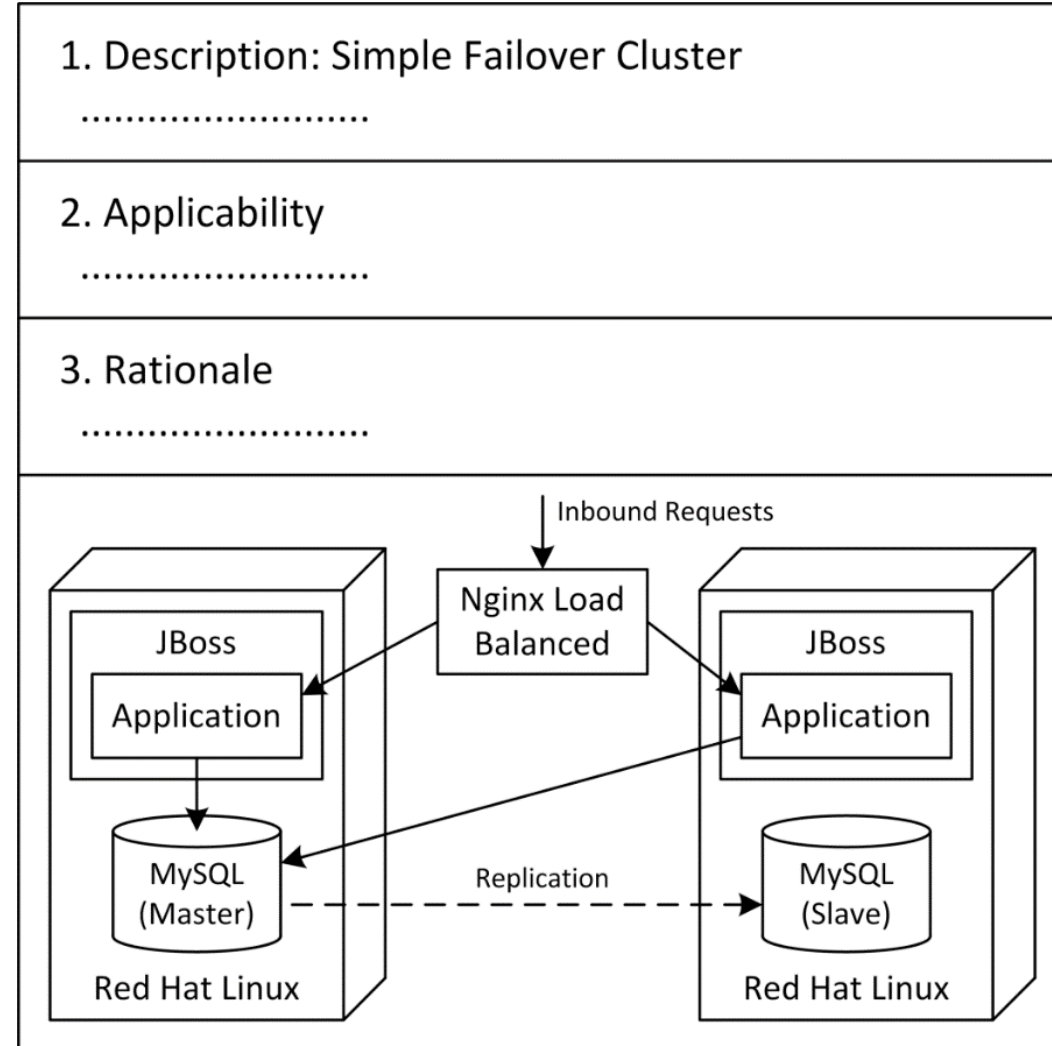
Patterns [common]

- Patterns (Features)
- The definition of a single Pattern often includes its description, applicability, rationale and solution sections:
 - **Description** explains what common problem the Pattern is intended to solve and how
 - **Applicability** clarifies in which situations the Pattern should be and should not be applied
 - **Rationale** explains why the Pattern provides a preferred solution to the stated problem
 - **Solution** describes in detail the structure of the solution recommended by the Pattern
- Patterns themselves are intangible in nature and can be instantiated and materialized only via following their prescriptions in actual IT solutions

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Patterns (Schematic View)



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IT Principles [common]

- **IT Principles** are specific Standards defining global high-level IT-specific guidelines influencing all IT-related decisions and plans in an organization.
- IT Principles can be considered as a common subtype of Standards often found in successful EA practices.
- They can be often called simply principles.
- IT Principles are conceptually similar IT-oriented counterparts of business-focused Principles.
- IT Principles are formulated as brief written statements defining **what is important for IT and how IT needs to work.**

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IT Principles [common]

- IT Principles (Features)
- The definition of a single IT Principle may also include its statement, rationale and implications
- Unlike Principles, **IT Principles define purely IT-specific rules irrelevant to most business stakeholders**
- Organizations often establish ~10-20 or more guiding IT Principles agreed by architects and other IT leaders
- IT Principles are usually grouped according to their domains, e.g. applications, data, integration, infrastructure and security
- Large organizations may establish a hierarchy of global and local IT Principles

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IT Principles (Schematic View)

| | |
|----------------|--|
| Applications | IT Principle 1: Prefer Open Source Solutions Description: |
| | IT Principle 2: Log All Main Operations Description: |
| Data | IT Principle 3: Use Scalable Storage Description: |
| | IT Principle 4: Backup All Permanent Data Description: |
| Integration | IT Principle 5: Use Middleware for Integration Description: |
| | IT Principle 6: Avoid Binary Integration Protocols Description: |
| Infrastructure | IT Principle 7: Host in the Cloud Description: |
| | IT Principle 8: Dedicated Server for Each System Description: |
| Security | IT Principle 9: Place Public Systems in DMZ Description: |
| | IT Principle 10: Secure by Default Description: |

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Logical Data Models* [uncommon]

- **Logical Data Models** are specific Standards providing logical or even physical platform-specific definitions of the **key data entities and their relationship**
- Logical Data Models can be considered as an uncommon subtype of Standards used relatively rarely
- They can be also called logical information models, canonical data models, data schemas, etc.
- Logical Data Models **define main data types** with all their fields, often including exact titles, types and formats
- Logical Data Models may also **explain where and when these data objects are generated and consumed**

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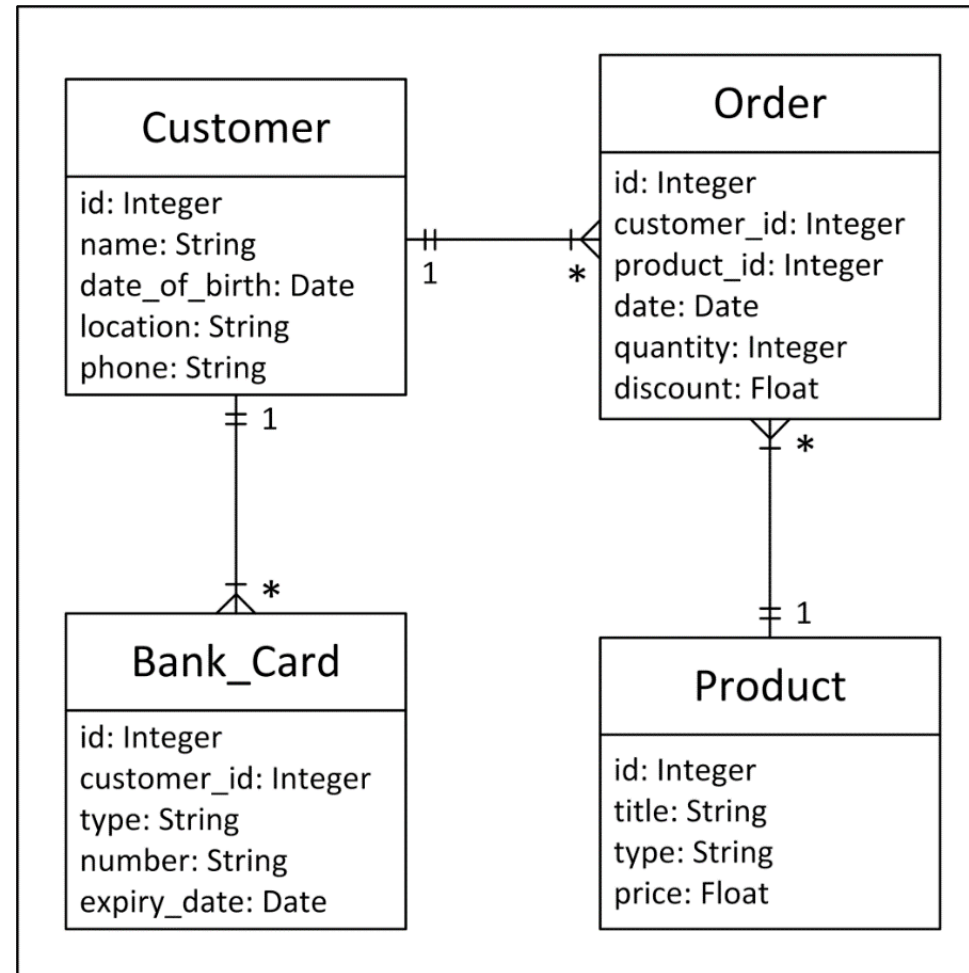
Logical Data Models* [uncommon]

- Logical Data Models (Features)
- Logical Data Models focus on the **most critical shared data entities**, e.g. **customer, product or order, that exist separately from specific applications** and are often **passed between different services and systems**
- Logical Data Models often represent **more detailed and IT-specific versions** of abstract Conceptual Data Models agreed with business executives
- Logical Data Models usually use special **entity-relationship modeling** notations intended only for IT specialists, e.g. UML
- Logical Data Models may provide multiple platform-specific definitions of same entities, e.g. in XSD and SQL
- Focus only on the most critical shared data entities of organization-wide significance that exist separately from specific applications and are often passed **between different services and systems**, e.g. customer, product or order entities. Similarly to business-focused Conceptual Data Models

Part B: EA Considerations and Standards

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Logical Data Models



Unlike simple and intuitive Conceptual Data Models, Logical Data Models usually use **special entity-relationship modeling** notations intended primarily for IT specialists and hardly understandable to most business stakeholders, e.g. UML. These diagrams provide purely technical descriptions of data entities, or classes, and may contain peculiar storage-specific details or fields.

The CSVLOD model of enterprise architecture



Take a Break!


BREAK
Time

**Break
time**

**BREAK
TIME**



A black tablet and a white stylus are shown on a wooden desk. The tablet is positioned diagonally, and the stylus lies next to it. The background is a light-colored wooden surface with a visible grain.

Enterprise
Computing
EMIT-607

Session 4

Part A and B

Session Outlines:

Part A: The CSVLOD Model of Enterprise Architecture

- Dimensions for Classifying Enterprise Architecture Artifacts
- Six General Types of Enterprise Architecture Artifacts
- The Resulting CSVLOD Model of Enterprise Architecture

Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Considerations
- Standards as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Standards

Part C: EA Visions and Landscapes

- Visions as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Visions
- Landscapes as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Landscapes

2

Executive Master of IT

الجزء أ: عمليات ممارسة هندسة المشاريع
العمليات التي تشكل ممارسة هندسة المشاريع
العلاقة بين العمليات المرتبطة بـ EA
عرض عملية عالي المستوى لممارسة هندسة المؤسسة

الجزء ب: مبادرات تكنولوجيا المعلومات وبنية المؤسسة
دور مبادرات تكنولوجيا المعلومات في ممارسة هندسة المشاريع
أنواع مختلفة من مبادرات تكنولوجيا المعلومات
تدفق أنواع مختلفة من مبادرات تكنولوجيا المعلومات

Part A: The CSVLOD Model of Enterprise Architecture



- Dimensions for Classifying Enterprise Architecture Artifacts
- Six General Types of Enterprise Architecture Artifacts
- The Resulting CSVLOD Model of Enterprise Architecture

الجزء أ: عمليات ممارسة هندسة المشاريع
العمليات التي تشكل ممارسة هندسة المشاريع
العلاقة بين العمليات المرتبطة بـ EA
عرض عملية عالي المستوى لممارسة هندسة المؤسسة

Part A: The CSVLOD Model of Enterprise Architecture

- Dimensions for Classifying Enterprise Architecture Artifacts
- Six General Types of Enterprise Architecture Artifacts
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Introduction:

- Previously, we presented the CSVLOD model which conceptualizes the notion of enterprise architecture as a set of six general types of EA artifacts:
 1. Considerations (e.g. principles and policies).
 2. Standards (e.g. technology reference models and guidelines).
 3. Visions (e.g. business capability models and roadmaps).
 4. Landscapes (e.g. landscape diagrams and inventories).
 5. Outlines (e.g. solution overviews and options assessments).
 6. Designs (e.g. various solution designs).

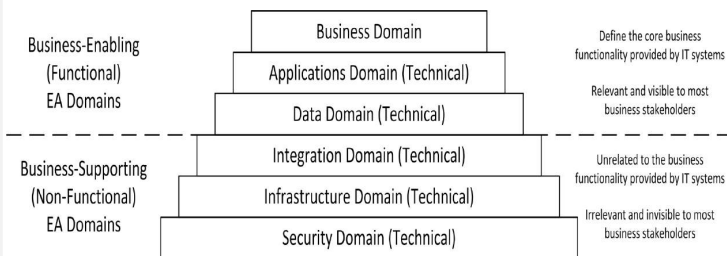
بالكاد تشبه نماذج العمليات المعروفة ممارسات التقييم البيئي الناجحة ، فكيف يمكن تصور ممارسة التقييم البيئي وشرحها من منظور العملية؟
في السابق ، قدمنا نموذج CSVLOD الذي يضع تصوّرًا لمفهوم بنية المؤسسة كمجموعة من ستة أنواع عامة من أدوات EA: الاعتبارات (مثل المبادئ والسياسات) ؛ المعايير (مثل النماذج المرجعية للتكنولوجيا والمبادئ التوجيهية) ؛ الرؤى (مثل نماذج القفرة التجارية وخرائط الطريق) ؛ المناظر الطبيعية (مثل مخططات المناظر الطبيعية وقوائم الجرد) ؛ الخطوط العريضة (على سبيل المثال ، لمحات عامة عن الحلول وتقييمات الخيارات) والتصاميم (مثل تصميمات الحلول المختلفة).
يُظهر التحليل الإضافي لممارسات التقييم البيئي الثابت أنه يمكن تصور ممارسة التقييم البيئي بشكل عام على أنها مجموعة من ثلاث عمليات متميزة ولكنها مترابطة مع أهداف مختلفة ومشاركين ونتائج تدور حول هذه الأنواع العامة الستة من أدوات التقييم البيئي:

1. تخطيط استراتيجي،
2. تسليم المبادرة
3. تحسين التكنولوجيا (يركز على ممارسات EA الداخلية التي يتم تنفيذها داخل المؤسسات).

Part A: The CSVLOD Model of Enterprise Architecture

- The Resulting CSVLOD Model of Enterprise Architecture
- **Dimensions for Classifying Enterprise Architecture Artifacts**
- Six General Types of Enterprise Architecture Artifacts

The Stack of EA Domains:



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Business – the **business domain** views an organization from the perspective of its business operations, e.g. capabilities, processes, tasks, roles, locations, value streams, customer experience, etc

Applications – the **applications domain** views an organization from the perspective of its end-user applications, e.g. applied programs, corporate systems, online websites, mobile apps, custom software, vendor products, etc

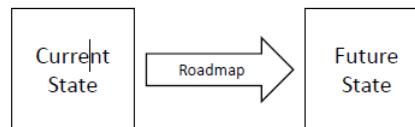
Data – the **data domain** views an organization from the perspective of its core data, e.g. data entities, their structures and representation formats.

Part A: The CSVLOD Model of Enterprise Architecture

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EA as Two States and Roadmap

- Enterprise architecture consists of three components:
- Current (baseline, as-is, existing, etc.) state
- Future (target, to-be, desired, etc.) state
- Roadmap (or transition plan)



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Thinking about enterprise architecture as the current state, future state and roadmap is inadequate

Current situation in the EA discipline:

Both popular conceptualizations of enterprise architecture are inadequate

No alternative evidence-based conceptualizations exists

It is not clear what components constitute enterprise architecture

For many years the phenomenon of enterprise architecture has no meaningful explanation

Part A: The CSVLOD Model of Enterprise Architecture

CSVLOD Model

- Dimensions for Classifying Enterprise Architecture Artifacts
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- The Resulting CSVLOD Model of Enterprise Architecture
- The CSVLOD model is a novel conceptualization of enterprise architecture from scratch that:
- Emerged from research, not from marketing
- Supported by evidence from real organizations
- Reflects genuine industry EA best practices
- Accurately describes empirical realities of EA
- Fills the critical gap in the EA discipline

نبثقت من البحث وليس من التسويق

مدعومة بأدلة من منظمات حقيقية
يعكس أفضل ممارسات الخبراء في الصناعة الحقيقية
EA يصف بدقة الحقائق التجريبية لـ

يملاً الفجوة الحرجة في تخصص

Part A: The CSVLOD Model of Enterprise Architecture

- Dimensions for Classifying Enterprise Architecture Artifacts
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Dimensions will help better understand the general properties of different types of EA artifacts

Dimensions for Classifying EA Artifacts

- The key element of the CSVLOD model is the taxonomy for EA artifacts
- The **first dimension** classifies all EA artifacts into **rules, structures and changes**
- The **second dimension** classifies all EA artifacts into **business-focused and IT-focused**

These dimensions help better understand the general properties of different types of EA artifacts. The first dimension classifies all EA artifacts into rules, structures and changes. The second dimension classifies all EA artifacts into business-focused and IT-focused

Part A: The CSVLOD Model of Enterprise Architecture

- Dimensions for Classifying Enterprise Architecture Artifacts
 - Dimension one "What"
 - Dimension two "how"
- Six General Types of Enterprise Architecture Artifacts
- The Resulting CSVLOD Model of Enterprise Architecture

Dimension One: What?

- Classifies EA artifacts based on *what objects they describe*
- All EA artifacts can be classified into:
 - **Rules** - describe broad global rules defining an organization or its divisions
 - **Structures** - describe high-level structures of an organization or its parts
 - **Changes** - describe specific proposed incremental changes to an organization

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Rules EA artifacts describe broad global *rules* defining an organization or its divisions

They are often represented in textual formats

Rules typically apply to all instances of a certain type

They are permanent EA artifacts

Rules provide the basis for all other planning decisions and usually answer the question

"How do we work or want to work?"

The purpose of all rules is to help achieve consistency and homogeneity of all planning decisions and approaches used in an organization

▪ القواعد تصف عناصر EA القواعد العالمية الواسعة التي تحدد

Part A: The CSVLOD Model of Enterprise Architecture

Dimensions for Classifying Enterprise Architecture Artifacts

Dimension one "What"

- Rules
- Structure
- Changes

Dimension two "how"

- Six General Types of Enterprise Architecture Artifacts
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Dimension One: What?

Rules EA artifacts describe general global *rules* defining an organization or its divisions. They are often represented in textual formats.

Rules typically apply to all instances of a certain type

For example, rules may define:

- how all business processes in an organization should be run or
- how all information systems in its IT landscape should be implemented.

Rules are **permanent** EA artifacts (see Table 2.2), which are usually **created once and then periodically updated**. They are the most **stable and infrequently changing** EA artifacts.

These **artifacts provide the basis for all other planning decisions** and usually answer the following question: "How do we work or want to work?"

For instance, rules may prescribe to install Linux operating systems on all servers, but at the same time there might be zero, one, 50 or 1000 Linux-based servers actually running in an organization.

The general purpose of all rules EA artifacts is to help achieve consistency and homogeneity of all planning decisions and approaches used in an organization

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- القواعد تصف عناصر EA القواعد العالمية الواسعة التي تحدد منظمة أو أقسامها
- غالبًا ما يتم تمثيلها في أشكال نصية
- تنطبق القواعد عادةً على جميع مثيلات نوع معين
- إنها أدوات EA دائمة
- توفر القواعد الأساس لجميع قرارات التخطيط الأخرى وعادة ما تجيب على السؤال "كيف نعمل أو نريد العمل؟"
- الغرض من جميع القواعد هو المساعدة في تحقيق الاتساق والتجانس لجميع قرارات التخطيط والنهج المستخدمة في المنظمة

Part A: The CSVLOD Model of Enterprise Architecture

Dimensions for Classifying Enterprise Architecture Artifacts

Dimension one "What"

- Rules
- Structure
- Changes

Dimension two "how"

- Six General Types of Enterprise Architecture Artifacts
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Dimension One: What?

Structures EA artifacts describe high-level structures of an organization or its parts.

They are usually represented in graphical formats. Unlike rules.

Structures refer to specific but abstract instances and often describe the relationship between different instances.

For example, structures may describe

- how different IT systems relate to specific business capabilities or
- how these systems are connected to each other.

Structures are permanent EA artifacts, which are usually created once and then continuously updated.

They are relatively stable, but change together with an organization and its plans.

These artifacts provide high-level "maps" facilitating decision-making and usually answer the following question: "What approximately do we have or want to have?"

Structures are typically tangible and countable since they describe specific instances and their relationship.

The general purpose of all structures EA artifacts is to help understand what changes are desirable in an organization and how to implement them.

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- الهيكل تصف مصنوعات EA الهياكل عالية المستوى لمنظمة ما أو أجزائها
- يتم تمثيلها عادة في تنسيقات رسومية
- تشير الهياكل إلى حالات محددة ولكنها مجردة
- إنها أدوات EA دائمة
- توفر الهياكل "خرائط" عالية المستوى تسهل عملية اتخاذ القرار عادة ما تجيب على السؤال "ما الذي نملكه أو نريده تقريباً؟"
- الغرض من جميع الهياكل هو المساعدة في فهم التغييرات المرغوبة في المنظمة وكيفية تنفيذها

Changes EA artifacts describe specific proposed incremental changes to an organization, i.e., concrete change initiatives or

Part A: The CSVLOD Model of Enterprise Architecture

Dimensions for Classifying Enterprise Architecture Artifacts

Dimension one "What"

- Rules
- Structure
- Changes

Dimension two "how"

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Dimension One: What?

Changes EA artifacts describe specific proposed incremental *changes* to an organization, i.e. separate change initiatives or projects

They are usually represented in mixed textual and graphical formats

Unlike structures, changes thoroughly describe concrete instances with their internal details, e.g. separate process steps, system components, functional specifications, data objects and communication interfaces.

For example, changes may describe

- how exactly a new IT system needs to be implemented
- how exactly this system will modify particular business processes.

Changes are **temporary EA artifacts**, which are usually created for specific purposes and then discarded

Changes represent tactical plans of an organization and usually answer the question "What exactly are we going to change right now?"

The purpose of all changes is to help plan separate organizational changes in detail

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- التغييرات تصف عناصر EA تغييرات تدريجية مقترحة محددة على مؤسسة ، أي مبادرات أو مشاريع تغيير منفصلة
- وعادة ما يتم تمثيلها في صيغ مختلطة
- التغييرات تصف بدقة الحالات الملموسة
- إنها أدوات EA مؤقتة
- تمثل التغييرات خططًا تكتيكية لمنظمة وعادة ما تجيب على السؤال "ما الذي سنغيره بالضبط الآن؟"
- الغرض من جميع التغييرات هو المساعدة في التخطيط لتغييرات تنظيمية منفصلة بالتفصيل

Part A: The CSVLOD Model of Enterprise Architecture

▪ Dimensions for Classifying Enterprise Architecture Artifacts

▪ Dimension one "What"

- Rules
- Structure
- Changes

▪ Dimension two "how"

- Six General Types of Enterprise Architecture Artifacts
- The Resulting CSVLOD Model of Enterprise Architecture

| Artifacts | Permanent EA artifacts | Temporary EA artifacts |
|-----------|--|--|
| Scope | Broad scope, beyond specific IT initiatives | Narrow scope, limited to specific IT initiatives |
| Lifespan | Long-lived, often exist for years | Short-lived, exist for months or even weeks |
| Usage | Created once, periodically updated, constantly used and occasionally discarded | Created for particular purposes, used as intended and then immediately discarded |

Table 2.2. Permanent and temporary EA artifacts

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Rules EA artifacts describe broad global *rules* defining an organization or its divisions

They are often represented in textual formats

Rules typically apply to all instances of a certain type

They are permanent EA artifacts

Rules provide the basis for all other planning decisions and usually answer the question

"How do we work or want to work?"

The purpose of all rules is to help achieve consistency and homogeneity of all planning decisions and approaches used in an organization

▪ القواعد تصف عناصر EA القواعد العالمية الواسعة التي تحدد

Part A: The CSVLOD Model of Enterprise Architecture

- Dimensions for Classifying Enterprise Architecture Artifacts
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Rules, Structures and Changes

| Artifacts | Rules | Structures | Changes |
|-----------|--|--|---|
| Describe | Broad global rules defining an organization or its divisions | High-level structures of an organization or its parts | Specific proposed incremental changes to an organization |
| Scope | Very wide, often cover an entire organization | Wide, often cover large parts of an organization | Narrow, limited to separate IT initiatives or projects |
| Format | Often textual | Usually graphical | Mix of textual and graphical |
| Question | How do we work or want to work? | What approximately do we have or want to have? | What exactly are we going to change right now? |
| Lifecycle | Permanent, created once and then periodically updated | Permanent, created once and then continuously updated | Temporary, created for specific purposes and then discarded |
| Role | Basis for all other planning decisions | High-level "maps" facilitating decision-making | Tactical plans of an organization |
| Purpose | Help achieve consistency and homogeneity of all planning decisions | Help understand what changes are desirable and how to implement them | Help plan separate changes in detail |

Part A: The CSVLOD Model of Enterprise Architecture

▪ Dimensions for Classifying Enterprise Architecture Artifacts

- Dimension one “What”
- Dimension two “how”
 - Business-focused
 - IT-focused

▪ Six General Types of Enterprise Architecture Artifacts

▪ The Resulting CSVLOD Model of Enterprise Architecture

Dimension Two: How?

- Classifies EA artifacts based on *how they describe objects*
- All EA artifacts can be classified into:
 - **Business-focused** - tend to be technology-neutral and use business language (e.g. money, customers, capabilities, business goals, competitive advantages, etc.)
 - **IT-focused** - tend to be purely technical and use IT-specific language (systems, applications, databases, platforms, networks, etc.)

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Business-focused EA artifacts tend to be technology-neutral and use plain business language

They tend to be brief, largely informal, use highly intuitive formats and contain only the most essential information

Business-focused EA artifacts are intended largely for business executives and always dual EA artifacts

Essentially, these EA artifacts can be considered as communication “interfaces” between business and IT

The purpose of all business-focused EA artifacts is to help business leaders manage IT without understanding its technical details

Part A: The CSVLOD Model of Enterprise Architecture

▪ Dimensions for Classifying Enterprise Architecture Artifacts

- Dimension one “What”
- Dimension two “how”
 - Business-focused
 - IT-focused

▪ Six General Types of Enterprise Architecture Artifacts

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Dimension Two: How?

Business-focused - tend to be technology-neutral and use plain business language (e.g. money, customers, capabilities, business goals, competitive advantages, etc.)

- They tend to be brief, largely informal, use highly intuitive formats and contain only the most essential information
- Business-focused EA artifacts are intended largely for business executives and always dual EA artifacts
 - aiming to facilitate effective collaboration and partnership between business and IT stakeholders
 - Fig. 2.5
- Essentially, these EA artifacts can be considered as communication “interfaces” between business and IT
- All business-focused EA artifacts are either developed collaboratively by architects and business executives, or at least consciously approved by business leaders
- The purpose of all business-focused EA artifacts is to [help business leaders manage IT without understanding its technical details](#)

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Business-focused EA artifacts tend to be technology-neutral and use plain business language

They tend to be brief, largely informal, use highly intuitive formats and contain only the most essential information

Business-focused EA artifacts are intended largely for business executives and always dual EA artifacts

Essentially, these EA artifacts can be considered as communication “interfaces” between business and IT

The purpose of all business-focused EA artifacts is to help business leaders manage IT without understanding its technical details

Part A: The CSVLOD Model of Enterprise Architecture

▪ Dimensions for Classifying Enterprise Architecture Artifacts

- Dimension one “What”
- Dimension two “how”
 - Business-focused
 - IT-focused

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Dimension Two: How?

IT-focused EA artifacts tend to be purely technical and use highly IT-specific language. e.g. systems, applications, databases, platforms and networks

These artifacts typically cover various technical EA domains (e.g. applications, data, integration, infrastructure and security, see Figure 2.3) and sometimes the business domain as well (e.g. specific business processes or requirements).

Unlike business-focused EA artifacts, they can be more formal, voluminous and detailed to provide all the relevant implementation-specific information, sometimes using specialized and sophisticated

Essentially, these artifacts can be viewed as internal IT tools invisible to business.

All IT-focused EA artifacts are developed predominantly by architects with the involvement of other IT stakeholders when necessary.

The purpose of all IT- focused EA artifacts is to [help architects organize IT according to their best understanding of the business interests.](#)

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Business-focused EA artifacts tend to be technology-neutral and use plain business language

They tend to be brief, largely informal, use highly intuitive formats and contain only the most essential information

Business-focused EA artifacts are intended largely for business executives and always dual EA artifacts

Essentially, these EA artifacts can be considered as communication “interfaces” between business and IT

The purpose of all business-focused EA artifacts is to help business leaders manage IT without understanding its technical details

Part A: The CSVLOD Model of Enterprise Architecture

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Business- and IT-Focused EA Artifacts

| Artifacts | Business-focused | IT-focused |
|--------------|--|---|
| Language | Technology-neutral business language | Technical IT-specific language |
| Domains | Business domain and often other relevant domains at a high level | Applications, data, integration, infrastructure, security domains and sometimes business domain |
| Format | Brief, intuitive, largely informal and include only the most essential information | Can be voluminous, formal, use strict notations and include comprehensive details |
| Stakeholders | Business leaders and architects | Architects and other IT specialists |
| Role | Communication interfaces between business and IT | Internal IT tools invisible to business |
| Purpose | Help business leaders manage IT | Help architects organize IT |

Part A: The CSVLOD Model of Enterprise Architecture

- Dimensions for Classifying Enterprise Architecture Artifacts
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| | | What Artifacts Describe? | | |
|-------------------------|------------------|--|---|---|
| | | Rules | Structures | Changes |
| How Artifacts Describe? | Business-Focused | Considerations (Business-Focused Rules) | Visions (Business-Focused Structures) | Outlines (Business-Focused Changes) |
| | IT-Focused | Standards (IT-Focused Rules) | Landscapes (IT-Focused Structures) | Designs (IT-Focused Changes) |
| | | Describe: General global rules defining an organization or its divisions Scope: Very broad, often relate to an entire organization Format: Often textual Question: How do we work or want to work? Lifecycle: Created once and then periodically updated Role: Basis for all other planning decisions Purpose: Help achieve consistency and homogeneity | Describe: High-level structures of an organization or its parts Scope: Broad, often cover large areas of an organization Format: Usually graphical Question: What approximately do we have or want to have? Lifecycle: Created once and then continuously updated Role: High-level "maps" facilitating decision-making Purpose: Help understand what changes are desirable and how to implement them | Describe: Specific proposed changes to an organization Scope: Narrow, limited to separate IT initiatives or projects Format: Mix of textual and graphical Question: What exactly are we going to change right now? Lifecycle: Created for specific purposes and then discarded Role: Tactical plans of an organization Purpose: Help plan separate changes in detail |

Figure 8.1. The CSVLOD taxonomy for EA artifacts

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The intersection of the two dimensions, i.e. what and how, produces a six-cell taxonomy for EA artifacts:

All business-focused rules EA artifacts are titled as Considerations

All IT-focused rules EA artifacts are titled as Standards

All business-focused structures EA artifacts are titled as Visions

All IT-focused structures EA artifacts are titled as Landscapes

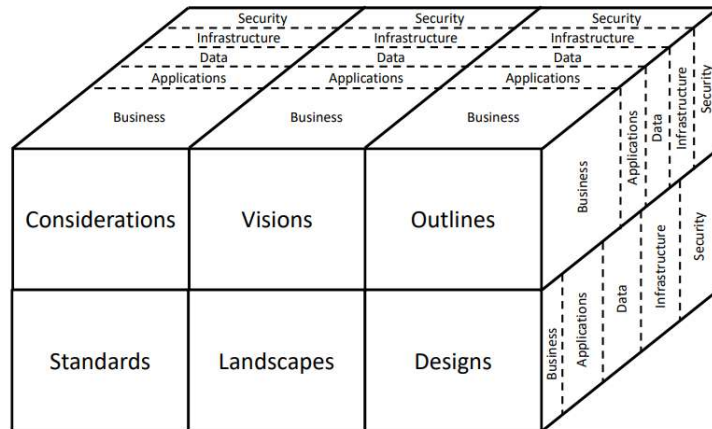
All business-focused changes EA artifacts are titled as Outlines

All IT-focused changes EA artifacts are titled as Designs

Part A: The CSVLOD Model of Enterprise Architecture

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CSVLOD Model of EA



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The intersection of the two dimensions, i.e. what and how, produces a six-cell taxonomy for EA artifacts:

All business-focused rules EA artifacts are titled as Considerations

All IT-focused rules EA artifacts are titled as Standards

All business-focused structures EA artifacts are titled as Visions

All IT-focused structures EA artifacts are titled as Landscapes

All business-focused changes EA artifacts are titled as Outlines

All IT-focused changes EA artifacts are titled as Designs

Part A: The CSVLOD Model of Enterprise Architecture

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General Types and Narrow Subtypes

- Each general type represents a broad variety of different EA artifacts with similar properties and purposes
- However, for each general type there is a limited set of widely used narrow subtypes of EA artifacts
- All subtypes of EA artifacts can be grouped into three categories based on their relative popularity:
 - **Essential EA artifacts** - used in the majority of EA practices
 - **Common EA artifacts** - used in ~25-50% of EA practices
 - **Uncommon EA artifacts** - used in approximately ~10-25% of EA practices
- These subtypes of EA artifacts are often used under different titles in different organizations



Part B: EA Considerations and Standards



- Considerations as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Considerations
- Standards as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Standards

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الجزء أ: عمليات ممارسة هندسة المشاريع
العمليات التي تشكل ممارسة هندسة المشاريع
العلاقة بين العمليات المرتبطة بـ EA
عرض عملية عالي المستوى لممارسة هندسة المؤسسة

Part B: EA Considerations and Standards

- **Considerations as a General Type of Enterprise Architecture Artifacts**
- Specific Enterprise Architecture Artifacts Related to Considerations
- Standards as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Standards

Considerations as an EA Artifact

- **Considerations** describe **global conceptual rules** and considerations **important for business** and **relevant for IT**
- Considerations represent **planning decisions** on how an organization needs to **work from the IT perspective**
- They are developed collaboratively by **senior business executives** and **architects** and then used to influence all “downstream” architectural decisions
- The purpose of all Considerations is to help achieve the agreement on basic **principles**, **values** and **aims**
- The proper use of Considerations leads to improved **overall conceptual consistency** between **business and IT**

Part B: EA Considerations and Standards

- **Considerations as a General Type of Enterprise Architecture Artifacts**
- Specific Enterprise Architecture Artifacts Related to Considerations
- Standards as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Standards

Considerations as an EA Artifact Examples

- **Principles (essential)** – global high-level guidelines influencing all decision- making and planning in an organization
- **Policies (common)** – overarching organizational norms typically of a restrictive nature providing compulsory prescriptions in certain areas
- **Conceptual Data Models (uncommon)** – abstract definitions of the main data entities critical for the business of an organization and their relationship
- **Analytical Reports (uncommon)** – executive-level analyses of relevant technology trends and their potential impact on the business of an organization
- **Direction Statements (uncommon)** – conceptual messages communicating major organization-wide decisions with far-reaching consequences

Part B: EA Considerations and Standards

- **Considerations as a General Type of Enterprise Architecture Artifacts**
- Specific Enterprise Architecture Artifacts Related to Considerations
- Standards as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Standards

Considerations as an EA Artifact Examples

- Principles (essential)
- Policies (common)
- Conceptual Data Models (uncommon)
- Analytical Reports (uncommon)
- Direction Statements (uncommon)

Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Considerations
 - Principles (essential)
 - Policies (common)
 - Conceptual Data Models (uncommon)
 - Analytical Reports (uncommon)
 - Direction Statements (uncommon)
- Standards as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Standards

Principles Artifacts [essential]

- **Principles** are specific Considerations defining global high-level guidelines influencing all decision-making and planning in an organization
- Principles are formulated as brief **written statements defining what is important for an organization**
- Principles are very abstract and can be interpreted broadly depending on the context
- Organizations usually establish ~10-20 guiding Principles agreed by senior business and IT leaders

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Principles often define the integration and standardization requirements of the operating model

Organizations usually establish ~10-20 guiding Principles agreed by senior business and IT leaders

Large organizations often establish a hierarchy of global and local Principles

مبادئ

- غالبًا ما يتضمن تعريف مبدأ واحد بيئته وأساسه المنطقي وآثاره
- يقدم البين تعريفًا للمبدأ ، ويشرح الأساس المنطقي تبرير هذا المبدأ ، بينما تصف الآثار عواقبه
- غالبًا ما تحدد المبادئ متطلبات التكامل والتوحيد القياسي لنموذج التشغيل

Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Considerations
 - Principles (essential)
 - Policies (common)
 - Conceptual Data Models (uncommon)
 - Analytical Reports (uncommon)
 - Direction Statements (uncommon)
- Standards as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Standards

Principles (Schematic View)

| |
|---|
| Principle 1: Standardized Business Processes Statement: Rationale: Implications: |
| Principle 2: Single Customer View Statement: Rationale: Implications: |
| Principle 3: Business Continuity Statement: Rationale: Implications: |

Statement provides a definition of the Principle
Rationale explains the justification of this Principle,
Implications describe its consequences

For example, for the Principle "Business Continuity"
its Statement may clarify that "Critical business operations should not be interrupted even in case of severe emergency"

its Rationale may explain that "Uninterrupted 24/7 business operations are required to provide flawless customer experience and establish the reputation of the most trusted service provider according to the business strategy"

while one of **its Implications** may prescribe that "All critical information systems and databases should have geographically

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The definition of a single Principle often includes its statement, rationale and implications

Statement provides a definition of the Principle, rationale explains the justification of this Principle, while implications describe its consequences

Principles often define the integration and standardization requirements of the operating model

Organizations usually establish ~10-20 guiding Principles agreed by senior business and IT leaders

Large organizations often establish a hierarchy of global and local Principles

Example Principles

Principles

| Principle 1: Standardized business process | |
|--|---|
| Statement | Bupa offer induction training session for new employee in all departments |
| Rational | To reduce the error rate and increase the employee productivity by making sure employees are already trained and have a background of the work that will be done. |
| Implication | Improving employee knowledge aiming to reach the company goals efficiently and effectively. |
| Principle 2: single customers view | |
| Statement | Customers carrying Bupa's insurance will be offered the same services and treatments in any hospital. |
| Rational | Ensuring the best customer experience |
| Implication | Gaining the customer loyalty to reach the goal (serving over millions of lives) |
| Principle 3: Business Continuity | |
| Statement | Launching Bupa's portal to access and use business process remotely |
| Rational | To reduce cost waste and simplify business process and improve productivity |
| Implication | Alternative ways to manage business in case of pandemic and crisis. |

Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
- **Specific Enterprise Architecture Artifacts Related to Considerations**
 - Principles (essential)
 - **Policies (common)**
 - Conceptual Data Models (uncommon)
 - Analytical Reports (uncommon)
 - Direction Statements (uncommon)
- Standards as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Standards

Policies [common]

- **Policies** are specific Considerations defining overarching norms typically of a restrictive nature providing compulsory prescriptions in certain areas
- Policies can be considered as a common subtype of Considerations often found in EA practices
- They can be called security policies, cloud policies, access policies, etc.
- Policies are formulated **as textual descriptions usually specifying what an organization must or must not do**
- Policies are rather clear, unambiguous and **not a subject** of much debate, reinterpretation or controversy **إعانة التفسير أو الجدل لا يسمح**
- Policies are more often used in organizations processing more sensitive types of data (e.g. financial and personal information) and operating in more regulated industries from the informational perspective (e.g. banking and healthcare).
- Policies are often represented as MS Word documents listing and describing relevant regulatory norms

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Policies are usually restrictive in nature and often related to security, compliance and risk

Policies can either document some organization-specific decisions controlling the use of IT, or be derived from external compliance policies common for all organizations working in specific industries

Policies are more often used in organizations processing sensitive types of data, e.g. financial and personal, and operating in more regulated industries, e.g. banking and healthcare

Policies are often represented as MS Word documents listing and describing relevant regulatory norms

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Policies (Schematic View)

| | | |
|----------|---------------------------|--|
| External | National Privacy Policies | Policy 1: Personal Data Must Be Stored Onshore Description: |
| | | Policy 2: Destroy Personal Data When Not Needed Description: |
| | Sarbanes-Oxley Policies | Policy 3: Log All Accesses to Accounting Systems Description: |
| | | Policy 4: Retain Audit Trails and Emails for 5 Years Description: |
| Internal | Data Security Policies | Policy 5: No Sensitive Data on Mobile Devices Description: |
| | | Policy 6: Store Credit Cards in Encrypted Formats Description: |
| | Data Exchange Policies | Policy 7: Do Not Share Key Data with Third Parties Description: |
| | | Policy 8: Share Client Data with Trusted Partners Description: |
| | Cloud Hosting Policies | Policy 9: Use Only the PCI DSS Compliant Cloud Description: |
| | | Policy 10: Do Not Store Health Data in the Cloud Description: |

- Policies act as limiting constraints of all IT-related decision-making processes
- strict and compulsory, deviations from them are often not discussable
- Adherence to Policies is often checked and ensured during the approval of other more specific EA artifacts

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Policies act as limiting constraints of all IT-related decision-making processes

Policies are typically strict and compulsory, deviations from them are often not discussable

Adherence to Policies is often checked and ensured during the approval of other more specific EA artifacts

For instance, all Outlines and Designs of new IT initiatives must be compliant with the enacted Policies

Policies often provide the basis for developing more detailed Standards translating high-level regulatory norms into actionable implementation-level prescriptions

Example Policies

| | | |
|----------|---------------------------|---|
| External | National Privacy Policies | Policy 1: Data must be stored on premises cloud |
| | Sarbanes-Oxley Policies | Policy 2: Unused data can be destroyed after 5 years. |
| | | Policy 3: Log all access to Bupa's network Description: access and activity using Bupa's network is stored. |
| | | Policy 4: All Emails are archived / retrieved for 10 years. |
| Internal | Data Security Policy | Policy 5: External access has high constraint. Description: any external access (not Bupa's devices) is not allowed unless the user downloaded high security specific application on his devise. Policy 6: Customers bank information encrypted Description: only specific people working on finance department have access to it. |
| | Data Exchange Policy | Policy 7: No data sharing with third party Description: No storage devices allowed, no cloud access, restricted rules for external emails Policy 8: Information sharing to third party only thru authorized channel approved by cyber security team. |
| | Cloud hosting Policies | Policy 9: Use only the PCI DSS cloud after obtaining cyber security approval |
| | | Policy 10: all customer requests / records to be/ stored |
| | | |

| | | |
|----------|-----------------------------|--|
| External | Shipping policy | Policy 1: Consignee is the person entitled to delivery of the cargo. Description: Once the AWB issued from the system shipper consignee and agent are assigned and information are checked once the shipment is delivered against the real person collecting the shipment. |
| | National policy | Policy 2: Shipper shall comply with all applicable laws and government regulations of any country to or from which the cargo may be carried that is issued from IATA. Description: Shipper shall furnish such information and attach such documents to the air waybill as may be necessary to comply with such laws and regulations. Carrier is not liable to shipper and shipper shall indemnify Carrier for loss or expense due to shipper's failure to comply with this provision. |
| Internal | Data storing Policy | Policy 3: Destroy employee data after 5 years of storing. Description: The limit for storing employee data who retired or quite is five years. After that, data must be destroyed. Policy 4: Destroy job submission data after 1 year. Description: Storing user submission for a job information for only 1 year. Then destroy it and the user can add their information again to submit. |
| | Data exchange policy | Policy 5: Share any internal data with third parties. Description: Any request by third party to gain access to any internal data requires NDA to be signed by both parties and any violation to the NDA will lead for legal discipline action. |

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Part B: EA Considerations and Standards

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Conceptual Data Models [uncommon]

- Conceptual Data Model is an abstract definitions of the **main data entities critical for the business of an organization and their relationship**
- Once developed, it will provide high-level data-focused rules shaping all architectural decisions related to data management
- Conceptual Data Models influence the logical design of all business applications, storage systems and integration platforms manipulating with data
- All IT systems should be compliant (accept) with the established Conceptual Data Models which is necessary for maintaining consistency of data
- Conceptual Data Models typically also provide the basis for developing more detailed, low-level and platform-specific Logical Data Models

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Once developed, Conceptual Data Models provide high-level data-focused rules shaping all architectural decisions related to data management

Conceptual Data Models influence the logical design of all business applications, storage systems and integration platforms manipulating with data

All IT systems should be compliant with the established Conceptual Data Models, which is necessary for maintaining purity and consistency of data

Conceptual Data Models typically also provide the basis for developing more detailed, low-level and platform-specific Logical Data Models

Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
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Conceptual Data Models [uncommon]

- Conceptual Data Models allow business executives to explicitly specify -
 - what information is important for the business, propose standard naming conventions and agree on the semantic meaning of core data entities,
- On the other hand, definitions of the critical information provided by Conceptual Data Models shape the design of all IT systems handling the corresponding data.
 - For example, if Conceptual Data Models define the customer data entity as a set of name, date of birth, location and phone properties, then every IT system capturing customer data should capture name, date of birth, location and phone properties, while all customer databases should store these properties in appropriate formats.
- Conceptual Data Models can improve the organization-wide consistency of data across all business units as well as facilitate effective data exchange between partner organizations.

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Once developed, Conceptual Data Models provide high-level data-focused rules shaping all architectural decisions related to data management

Conceptual Data Models influence the logical design of all business applications, storage systems and integration platforms manipulating with data

All IT systems should be compliant with the established Conceptual Data Models, which is necessary for maintaining purity and consistency of data

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Conceptual Data Models [uncommon]

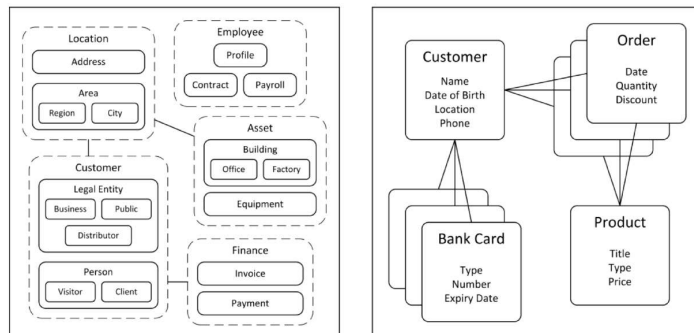


Figure 9.3. Conceptual Data Models (high-level models and low-level models)

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Once developed, Conceptual Data Models provide high-level data-focused rules shaping all architectural decisions related to data management

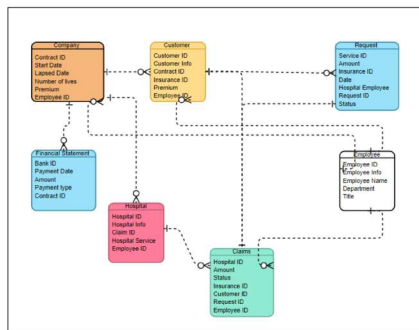
Conceptual Data Models influence the logical design of all business applications, storage systems and integration platforms manipulating with data

All IT systems should be compliant with the established Conceptual Data Models, which is necessary for maintaining purity and consistency of data

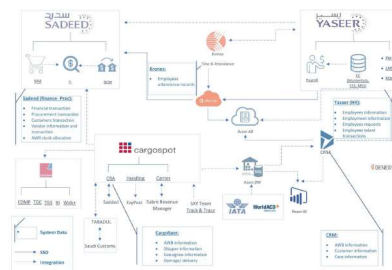
Conceptual Data Models typically also provide the basis for developing more detailed, low-level and platform-specific Logical Data Models

Example Conceptual Data model

Conceptual Data Models



Conceptual data model



Part B: EA Considerations and Standards

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Analytical Reports [uncommon]

- Analytical Reports (can be called whitepapers, position papers, strategy papers, etc.)
- Are specific Considerations providing executive-level analyses of relevant technology trends and their potential impact on the business
- Analytical Reports can be considered as an uncommon subtype of Considerations used relatively rarely
- Analytical Reports reflect a business-oriented analysis of the organizational technology environment
- Analytical Reports describe the influence of technology trends as well as the desirable reaction on these trends
- Analytical Reports are more often developed in relatively large companies heavily dependent on IT.

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Executive Master of IT

التقارير التحليلية هي اعتبارات محددة توفر تحليلات على المستوى التنفيذي لاتجاهات التكنولوجيا ذات الصلة وتأثيرها المحتمل على الأعمال التجارية
يمكن اعتبار التقارير التحليلية نوعاً فرعياً غير شائع من الاعتبارات المستخدمة نادرًا نسبيًا
يمكن أن يطلق عليها أوراق بيضاء ، أوراق موقف ، أوراق إستراتيجية ، إلخ.
تعكس التقارير التحليلية التحليل الموجه للأعمال لبيئة التكنولوجيا التنظيمية
تصف التقارير التحليلية تأثير اتجاهات التكنولوجيا بالإضافة إلى التفاعل المرغوب فيه على هذه الاتجاهات

These descriptions may include the answers to the following and similar questions

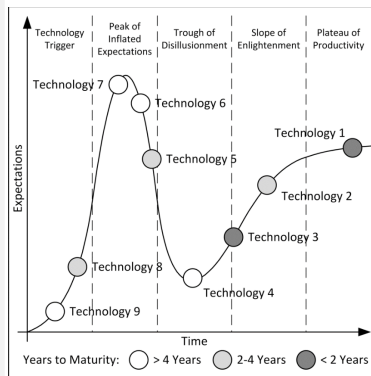
What new technologies may be relevant to the

Change of an organization

Part B: EA Considerations and Standards

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Analytical Reports (Schematic View)



| | Helpful | Harmful |
|----------|---------------------------|------------------------|
| Internal | Technology Strengths: | Technology Weaknesses: |
| | Strength 1: | Weakness 1: |
| | Strength 2: | Weakness 2: |
| | Strength 3: | Weakness 3: |
| External | Technology Opportunities: | Technology Threats: |
| | Opportunity 1: | Threat 1: |
| | Opportunity 2: | Threat 2: |
| | Opportunity 3: | Threat 3: |

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Analytical Reports provide an overarching decision-making framework for an organization

Analytical Reports inform and influence various business-related and IT-related decisions, including strategic decisions with significant long-term consequences as well as project-level decisions with local implications

- توفر التقارير التحليلية إطاراً شاملاً لاتخاذ القرارات للمؤسسة
- تقوم التقارير التحليلية بالإعلام والتأثير على مختلف القرارات المتعلقة بالأعمال والمتعلقة بتكنولوجيا المعلومات ، بما في ذلك القرارات الإستراتيجية ذات العواقب الكبيرة على المدى الطويل بالإضافة إلى القرارات على مستوى المشروع ذات الآثار المحلية

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Direction Statements [uncommon]

- Direction Statements** are specific Considerations describing conceptual messages communicating major organization-wide decisions with profound impact (تثير عميق)
- Direction Statements can be considered as an uncommon subtype of Considerations
- They can be called architecture strategies, governance papers, position papers, strategic papers, etc.
- Direction Statements **represent the results of strategic decision-making processes regarding the desired future direction of an organization or its major business units**
- تمثل بيانات الاتجاه نتائج عمليات اتخاذ القرار الاستراتيجي فيما يتعلق بالاتجاه المستقبلي المرغوب فيه لمنظمة أو وحدات أعمالها الرئيسية
- They can declare an organization-wide intention to go in a specific way, follow a particular approach, address a specific global need, do a certain thing or merely propose to leverage some new promising opportunity.
- For example, Direction Statements may articulate the desire of an organization to migrate all non-business-critical applications into the cloud, to consolidate all corporate information systems based on a single global ERP platform or, on the contrary, to develop custom IT systems tailored specifically for the unique needs of individual business units.

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التقارير التحليلية هي اعتبارات محددة توفر تحليلات على المستوى التنفيذي لاتجاهات التكنولوجيا ذات الصلة وتأثيرها المحتمل على الأعمال التجارية

يمكن اعتبار التقارير التحليلية نوعاً فرعياً غير شائع من الاعتبارات المستخدمة ناهراً نسبياً

يمكن أن يطلق عليها أوراق بيضاء ، أوراق موقف ، أوراق إستراتيجية ، إلخ.

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تصف التقارير التحليلية تأثير اتجاهات التكنولوجيا بالإضافة إلى التفاعل المرغوب فيه على هذه الاتجاهات

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Direction Statements (Schematic View)

- Strategic imperatives provided by Direction Statements drive all subsequent decision-making processes
- Direction Statements are the most action-oriented EA artifacts of all Considerations.
 - While other Considerations merely describe how an organization needs to work or analyze the technology environment, [Direction Statements point to a certain direction where an organization needs to go in the future and explain the rationale for this direction.](#)
- Direction Statements only indicate where an entire company needs to go without specifying how.
- Direction Statements can be considered as EA artifacts complementary to Analytical Reports.
 - While Analytical Reports analyze the general positioning of an organization from the technology perspective,
 - Direction Statements propose high-level strategies for addressing the suggestions of Analytical Reports.
- Developing more specific Visions
- Direction Statements are often temporary EA artifacts with a limited lifespan

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Strategic imperatives provided by Direction Statements drive all subsequent decision-making processes

In particular, Direction Statements often provide the basis for developing more specific Visions

Direction Statements may also influence on technology selection and on the overall evolution of the IT landscape

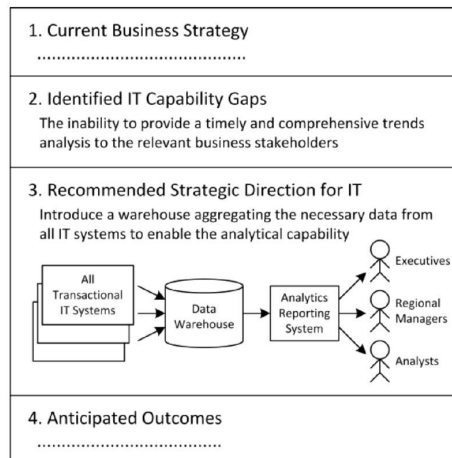
The alignment of all lower-level planning decisions to the endorsed Direction Statements is often evaluated during the approval of corresponding EA artifacts

Direction Statements are often temporary EA artifacts with a limited lifespan

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Direction Statements (Schematic View)



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Summary Artifacts Related to Considerations

- **Principles** are [essential Considerations](#) defining global high-level guidelines influencing all decision-making and helping business executives and architects agree on the most fundamental imperatives regarding the use of IT in an organization
- **Policies** are [common Considerations](#) defining overarching organizational norms and compulsory prescriptions of a restrictive nature and helping business leaders and architects agree on how an organization must not use its IT resources
- **Conceptual Data Models** are [uncommon Considerations](#) providing abstract definitions of the key data entities with their relationship and helping business leaders and architects achieve a shared understanding of the required structure of corporate data assets
- **Analytical Reports** are [uncommon Considerations](#) providing executive-level analyses of relevant technology trends and helping business leaders and architects develop a common attitude towards innovative and disruptive technologies
- **Direction Statements** are [uncommon Considerations](#) communicating major organization-wide planning decisions with far-reaching consequences and helping business executives and architects agree on the most general future course of action for business and IT
- Considerations in an EA practice is establishing trivial Considerations that only create an impression of planning and distract attention, but actually do not represent any real planning decisions

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Part B: EA Considerations and Standards

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Standards as EA Artifacts

- Standards are **IT-focused** rules EA artifacts, describe **global IT-specific rules**, **permanent** defined by **architects**
- Standards represent proven **reusable means** for IT systems implementation
- The general purpose of all Standards is to help achieve technical **consistency**, **technological homogeneity** and **regulatory compliance**
- Key organizational benefits of using Standards include:
 - Faster initiative delivery
 - Reduced costs
 - Mitigated risks
 - Lowered complexity
- Even though Standards are based on best business interests, they are developed exclusively by **architects and other senior IT experts** inside the IT department

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technological homogeneity **essentially alike or of the same kind**

regulatory compliance is **when a business follows state, federal, and international laws and regulations relevant to its operations**

Standards provide answers to the following and similar questions:

What technologies and products should be used in IT solutions?

How exactly should the available technologies be used in IT solutions?

What implementation approaches should be followed in IT solutions?

Part B: EA Considerations and Standards

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Standards as EA Artifacts

- Standards define **how all IT systems in an organization are implemented from the technology perspective.**
- The implementation-level guidelines reflected in Standards address the following and similar technical questions:
 - What technologies and products should be used in IT solutions?
 - How exactly should the available technologies be used in IT solutions?
 - What implementation approaches should be followed in IT solutions?
 - What system components should be reused in IT solutions?
 - How should IT systems be organized and integrated?
 - What protocols should be used for the interaction between IT systems?
 - How should main data entities be stored in IT systems?

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- توفر المعايير إجابات على الأسئلة التالية والأسئلة المماثلة:
- ما هي التقنيات والمنتجات التي يجب استخدامها في حلول تكنولوجيا المعلومات؟
- كيف بالضبط يجب استخدام التقنيات المتاحة في حلول تكنولوجيا المعلومات؟
- ما هي مناهج التنفيذ التي يجب اتباعها في حلول تكنولوجيا المعلومات؟
- ما هي مكونات النظام التي يجب إعادة استخدامها في حلول تكنولوجيا المعلومات؟
- كيف ينبغي أن تكون أنظمة تكنولوجيا المعلومات منظمة ومتكاملة؟
- ما هي البروتوكولات التي يجب استخدامها لتفاعل أنظمة تكنولوجيا المعلومات؟
- كيف يجب تخزين كيانات البيانات الرئيسية في أنظمة

Part B: EA Considerations and Standards

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- **Standards as a General Type of Enterprise Architecture Artifacts**
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Standards as EA Artifacts Examples

- Technology Reference Models – essential EA artifacts
- Guidelines – essential EA artifacts
- Patterns – common EA artifacts
- IT Principles – common EA artifacts
- Logical Data Models – uncommon EA artifacts

Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
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- Standards as a General Type of Enterprise Architecture Artifacts
- **Specific Enterprise Architecture Artifacts Related to Standards**
 - **Technology Reference Models - essential EA artifacts**
 - Guidelines - essential EA artifacts
 - Patterns - common EA artifacts
 - IT Principles - common EA artifacts
 - Logical Data Models - uncommon EA artifacts

Technology Reference Models [essential]

- **Technology Reference Models** are specific Standards providing **structured graphical representations** of all technologies used in an organization
- Technology Reference Models map all technologies and products used in an organization to the technical functions they fulfil or support
- It refers to **technology standards, technical reference models, technology reference architectures** or split into separate domain-specific reference models
- Technology Reference Models can be considered as an essential subtype of Standards found in the majority of successful EA practices.

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Technology Reference Models (Features):

Technology Reference Models organize the technology stack into layers, e.g. networks, servers, databases, etc.

In organizations relying on packaged solutions Technology Reference Models may be rather high-level, while in organizations with in-house development teams they contain more lower-level details

Technology Reference Models are color-coded to indicate the status of different technologies, for example:

Current – up-to-date technologies and products currently in use

Emerging – cutting-edge technologies planned for adoption

Part B: EA Considerations and Standards

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 - Guidelines – essential EA artifacts
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Technology Reference Models [essential]

- Represent comprehensive views of the whole organizational technology stack.
- Basically, Technology Reference Models **structure and describe the technology portfolio of an entire organization.**
- Compliance with Technology Reference Models help architects select the most appropriate technologies for new IT solutions
- The mechanism of color-coding, i.e. marking technologies as deprecated, current or strategic, also helps architects manage the lifecycle of different technologies and optimize the entire technology portfolio
- **Technology Reference Models play especially important roles in organizations having significant in-house software development resources and producing their own custom applications and systems, rather than in organizations relying on standard commercial off-the-shelf (COTS) products supplied by external vendors.**

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تمثل وجهات نظر شاملة لمجموعة التكنولوجيا التنظيمية بأكمله يقومون بتعيين جميع التقنيات والمنتجات المستخدمة في المؤسسة للوظائف الفنية ذات الصلة التي يقومون بتنفيذها أو دعمها.

في الأساس ، تقوم النماذج المرجعية للتكنولوجيا ببناء وتصف حافظة التكنولوجيا لمؤسسة بأكملها.

▪ تساعد النماذج المرجعية للتكنولوجيا المهندسين المعماريين على اختيار أنسب التقنيات لحلول تكنولوجيا المعلومات الجديدة

▪ يتحقق التوافق مع النماذج المرجعية للتكنولوجيا من خلال مراجعة النظراء للخطوط العريضة والتصميمات لجميع حلول تكنولوجيا المعلومات ومناقشة الانحرافات المحتملة

▪ تساعد آلية الترميز اللوني ، أي تعليم التقنيات على أنها

Part B: EA Considerations and Standards

- Considerations as a General Type of Enterprise Architecture Artifacts
- Specific Enterprise Architecture Artifacts Related to Considerations
- Standards as a General Type of Enterprise Architecture Artifacts
- **Specific Enterprise Architecture Artifacts Related to Standards**
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Technology Reference Models [essential]

- Basically, Technology Reference Models **structure and describe the technology portfolio of an entire organization.**
- Compliance with Technology Reference Models help architects select the most appropriate technologies for new IT solutions
- Technology Reference Models organize the technology stack into layers, e.g. networks, servers, databases, etc.
- Technology Reference Models are color-coded to indicate the status of different technologies, for example:
 - **Current** – up-to-date technologies and products currently in use
 - **Emerging** – cutting-edge technologies planned for adoption
 - **Unsupported** – outdated technologies that are currently in use
 - **Retiring** – legacy technologies planned to be retired

Technology Reference Models play especially important roles in organizations having significant **in-house software development** resources and producing their own custom applications and systems, **rather than in organizations relying on standard commercial off-the-shelf (COTS) products supplied by external vendors.**

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تمثل وجهات نظر شاملة لمجموعة التكنولوجيا التنظيمية بأكمله يقومون بتعيين جميع التقنيات والمنتجات المستخدمة في المؤسسة للوظائف الفنية ذات الصلة التي يقومون بتنفيذها أو دعمها.

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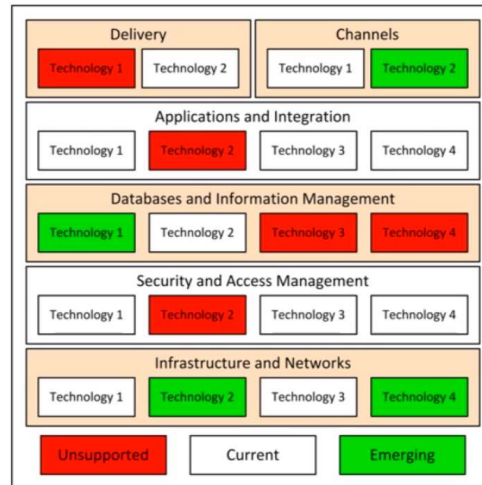
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Technology Reference Models (Schematic View)



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Compliance Technology Reference Models help architects select the **most appropriate technologies for new IT solutions**

with Technology Reference Models is achieved via peer-reviewing Outlines and Designs of all IT solutions and discussing possible deviations

The mechanism of color-coding, i.e. marking technologies as deprecated, current or strategic, also helps architects manage the lifecycle of different technologies and optimize the entire technology portfolio

Technology Reference Models play especially important roles in organizations having significant in-house software development

Example Technology Reference Model

• Technology Reference Models

| <u>Delivery</u> | | <u>Channel</u> | |
|--|------------------|------------------|----------------------|
| Office 365 | Dynamics 365 | Mobile App | Desktop App |
| CargoSpot | SAP S4/Hana | Web APP | |
| SAP Success factors | Power BI | | |
| Kronos | Genesys | | |
| Champ BI | AQD | | |
| <u>Application and integration</u> | | | |
| Cloud connector | Rest API | Boomi connectors | Standard connections |
| <u>Database and information management</u> | | | |
| Azure DWH | SAP cloud | MS shared cloud | Azure DB |
| <u>Security and access management</u> | | | |
| Azure SSO | Password policy | Trend micro | Azure security |
| <u>Infrastructure and network</u> | | | |
| Azure cloud | Azure on-prem AD | Azure VM | Network connectivity |
| Unsupported | Current | | Emerging |

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Guidelines [essential]

- **Guidelines** are usually grouped according to narrow **technology-specific domains** (e.g. network protocols, data encryption, server deployment, etc.) and maintained by relevant IT experts
- Guidelines are formulated as **brief written statements** providing actionable recommendations regarding the **usage of particular technologies in IT solutions**
 - e.g. “All data backups should be encrypted and password-protected to prevent unauthorized access”, “Each user request should be assigned a unique transaction ID to enable traceability” and “All interactions with external systems should be logged to monitor their SLAs”
- Guidelines are typically very concrete, unambiguous and **technical in nature**
- Guidelines focus mostly on the **internal structure of separate IT solutions**, rather than on the overall structure of the IT landscape
- Examples: how application deployed, protected, encryption, who access info, when to archive...

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- إرشادات (الميزات):
- عادةً ما يتم تجميع الإرشادات وفقًا لمجالات تقنية محددة (مثل بروتوكولات الشبكة وتشغيل البيانات ونشر الخادم وما إلى ذلك) ويتم الاحتفاظ بها بواسطة خبراء تكنولوجيا المعلومات المعنيين
- يتم تقديم الإرشادات عادةً بمرور الوقت حيث يتعلم المهندسون المعماريون وفرق المشروع أفضل الممارسات الجديدة التي تعكس الاستخدام الفعال للتقنيات في حلول تكنولوجيا المعلومات
- يمكن اشتقاق المبادئ التوجيهية من السياسات المعيارية رفيعة المستوى ومن أفضل الممارسات الصناعية المعمول بها
- في الشركات الكبيرة ، يمكن الاحتفاظ بقوائم منفصلة من الإرشادات بواسطة متخصصي تكنولوجيا المعلومات العاملين في مجالات مختلفة

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Guidelines

Guidelines complement Technology Reference Models and are often used in conjunction with them.

Technology Reference Models only specify what technologies should be used in IT solutions,

Guidelines provide more detailed prescriptions specifying exactly how these technologies should be used.

Technology Reference Models, which may be used only by architects,

Guidelines are often relevant to both architects and IT project teams.

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Guidelines (Schematic View)

| | |
|-----------------------------|--|
| Server Deployment Standards | Guideline 1: Run Applications as OS Services Description: |
| | Guideline 2: Store Deployment Packages in VCS Description: |
| Network Protocol Standards | Guideline 3: Avoid Using UDP Multicast Description: |
| | Guideline 4: Prefer REST Over SOAP Description: |
| Data Encryption Standards | Guideline 5: Use 256-Bit Encryption Keys Description: |
| | Guideline 6: Store MD5 Hashes of Passwords Description: |
| Interface Design Guidelines | Guideline 7: Use Web-Safe Colours Description: |
| | Guideline 8: Place Menu in the Top Right Corner Description: |
| Secure Coding Guidelines | Guideline 9: Initialize Variables to Safe Defaults Description: |
| | Guideline 10: Validate All Incoming Data Description: |

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Guidelines help architects and IT project teams follow proven best practices during the planning and implementation of new IT solutions

Many Guidelines provide very detailed and low-level prescriptions which are often too specific to be reflected in Designs, let alone in Outlines

For this reason the adherence to Guidelines is more often achieved via supervising project teams at the solution implementation stage, than via peer-reviewing Designs

- تساعد الإرشادات المهندسين المعماريين وفرق مشروعات تكنولوجيا المعلومات على اتباع أفضل الممارسات التي أثبتت جدواها أثناء التخطيط لحلول تكنولوجيا المعلومات الجديدة وتنفيذها
- توفر العديد من الإرشادات وصفات مفصلة للغاية ومنخفضة المستوى والتي غالبًا ما تكون محددة جدًا بحيث لا يمكن عكسها في التصاميم ، ناهيك عن الخطوط العريضة

Example Guidelines

- Guidelines

| | | | |
|----------------------------|---|-----------------------------|---|
| Interface design guideline | Guideline 1: Place menu in the top middle. Description: the menu bar must be in the top middle for all the pages in CARGO website for easy access and enables navigation. | | |
| | Guideline 2: Use SACC SAL fonts and colors guidelines. Description: Marketing has specific guidelines and templets used for SACC SAL that has to apply to each systems. | | |
| Operating system standard | Guideline 3: Use Windows 10 or above. Description: Installing win10 for all computers in the company, which is the most recent version of software. Also, it is compatible with the most recent releases of newer version of the programs needed in the company. | | |
| e-mail guideline | Guideline 4: preventing out Description: prevent open option to open it with user | Server deployment standards | Guideline 1: Launch new server with unreal data Description: New server must be tested for a period of time with unreal data and ensure everything is right before using it. Guideline 2: Server will not be used until its connected to a firewall Description: To ensure the security. |
| | | Network protocol standards | Guideline 3: No access to the network from external devices. Description: No one can access the network from external device unless its downloaded high security application Guideline 4: Prefer using Chrome Description: best performance with Bupa's application |
| | | Data encryption standards | Guideline 5: Use AES-128 encryption Description: Essential for electronic data protection Guideline 6: Use digital signature Description: To communicate with hospitals in safely manner. |
| | | Interface design standers | Guideline 7: Use the company identity colors Description: All website and application must be designed using Bupa's identity colors Guideline 8: Design user friendly interface with a lot icons and menu Description: To help customer navigate through the website easily |
| | | Secure coding guidelines | Guideline 9: Validate data entered Description: Check data validation first before storing in database Guideline 10: Code backup into the cloud Description: To prevent code loss |

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Patterns [common]

- **Patterns** are specific Standards providing generic **reusable solutions to commonly occurring problems** in the design of IT systems
- Patterns can be considered as a common subtype of Standards often found in successful EA practices
- They can be also called reference architectures
- Patterns represent **proven reusable components** for IT solutions addressing some common problems or needs
- Essentially, patterns offer complete logical “bricks” or building blocks from which new IT solutions can be constructed
- The same Patterns can be successfully reused in the design of multiple different IT solutions facing similar design problems.

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Patterns [common]

- Patterns (Features)
- The definition of a single Pattern often includes its description, applicability, rationale and solution sections:
 - **Description** explains what common problem the Pattern is intended to solve and how
 - **Applicability** clarifies in which situations the Pattern should be and should not be applied
 - **Rationale** explains why the Pattern provides a preferred solution to the stated problem
 - **Solution** describes in detail the structure of the solution recommended by the Pattern
- Patterns themselves are intangible in nature and can be instantiated and materialized only via following their prescriptions in actual IT solutions

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Patterns (Features)

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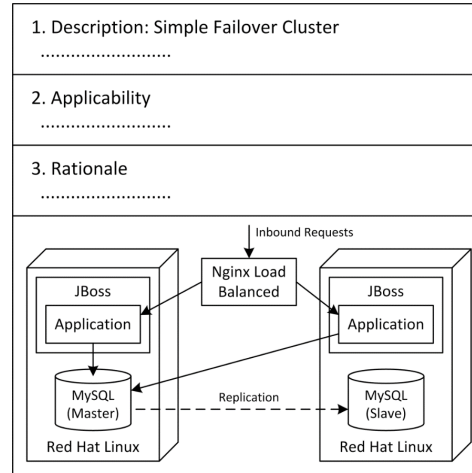
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Patterns (Schematic View)



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Usage:

A catalog of Patterns helps architects select and reuse proven implementation approaches during the planning of specific IT solutions, more often at the later Design stages of IT projects

Adherence to established Patterns is typically achieved via peer-reviewing Outlines and Designs of all IT solutions and discussing possible deviations

- استعمال:
- يساعد كتالوج الأنماط المهندسين المعماريين على اختيار وإعادة استخدام أساليب التنفيذ التي أثبتت جدواها أثناء التخطيط لحلول تقنية معلومات محددة ، في كثير من الأحيان في مراحل التصميم اللاحقة لمشاريع تكنولوجيا المعلومات
- يتحقق الالتزام بالأنماط الموضوعة عادةً عن طريق مراجعة الأقران للخطوط العريضة والتصميمات لجميع حلول تكنولوجيا المعلومات ومناقشة الانحرافات المحتملة

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IT Principles [common]

- **IT Principles** are specific Standards defining global high-level IT-specific guidelines influencing all IT-related decisions and plans in an organization.
- IT Principles can be considered as a common subtype of Standards often found in successful EA practices.
- They can be often called simply principles.
- IT Principles are conceptually similar IT-oriented counterparts of business-focused Principles.
- IT Principles are formulated as brief written statements defining **what is important for IT and how IT needs to work**.

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IT Principles (Features)

The definition of a single IT Principle may also include its statement, rationale and implications

Unlike Principles, IT Principles define purely IT-specific rules irrelevant to most business stakeholders

Organizations often establish ~10-20 or more guiding IT Principles agreed by architects and other IT leaders

IT Principles are usually grouped according to their domains, e.g. applications, data, integration, infrastructure and security

Large organizations may establish a hierarchy of global and local IT Principles

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IT Principles (Schematic View)

| | |
|----------------|--|
| Applications | IT Principle 1: Prefer Open Source Solutions Description: |
| | IT Principle 2: Log All Main Operations Description: |
| Data | IT Principle 3: Use Scalable Storage Description: |
| | IT Principle 4: Backup All Permanent Data Description: |
| Integration | IT Principle 5: Use Middleware for Integration Description: |
| | IT Principle 6: Avoid Binary Integration Protocols Description: |
| Infrastructure | IT Principle 7: Host in the Cloud Description: |
| | IT Principle 8: Dedicated Server for Each System Description: |
| Security | IT Principle 9: Place Public Systems in DMZ Description: |
| | IT Principle 10: Secure by Default Description: |

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Once established, IT Principles act as underpinning drivers of all IT-specific decisions

IT Principles help architects select the most appropriate implementation approaches for all IT initiatives, often at the early Outline stages of IT projects

Alignment to IT Principles is required for all IT plans and decisions

This alignment is typically achieved by means of peer-reviewing and discussing Outlines, Designs and Landscapes

- بمجرد إنشائها ، تعمل مبادئ تكنولوجيا المعلومات كمحركات داعمة لجميع القرارات الخاصة بتكنولوجيا المعلومات
- تساعد مبادئ تكنولوجيا المعلومات المهندسين المعماريين على اختيار أساليب التنفيذ الأكثر ملاءمة لجميع مبادرات تكنولوجيا المعلومات ، غالبًا في مراحل المخطط التفصيلي المبكرة لمشاريع تكنولوجيا

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Logical Data Models* [uncommon]

- **Logical Data Models** are specific Standards providing logical or even physical platform-specific definitions of the **key data entities and their relationship**
- Logical Data Models can be considered as an uncommon subtype of Standards used relatively rarely
- They can be also called logical information models, canonical data models, data schemas, etc.
- Logical Data Models **define main data types** with all their fields, often including exact titles, types and formats
- Logical Data Models may also **explain where and when these data objects are generated and consumed**

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Logical

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Logical Data Models* [uncommon]

- Logical Data Models (Features)
- Logical Data Models focus on the **most critical shared data entities**, e.g. **customer, product or order**, that exist separately from specific applications and are often **passed between different services and systems**
- Logical Data Models often represent **more detailed and IT-specific versions** of abstract Conceptual Data Models agreed with business executives
- Logical Data Models usually use special **entity-relationship modeling** notations intended only for IT specialists, e.g. UML
- Logical Data Models may provide multiple platform-specific definitions of same entities, e.g. in XSD and SQL
- Focus only on the most critical shared data entities of organization-wide significance that exist separately from specific applications and are often passed **between different services and systems**, e.g. customer, product or order entities. Similarly to business-focused Conceptual Data Models

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Logical Data Models (Features)

Logical Data Models focus on the most critical shared data entities, e.g. customer, product or order, that exist separately from specific applications and are often passed between different services and systems

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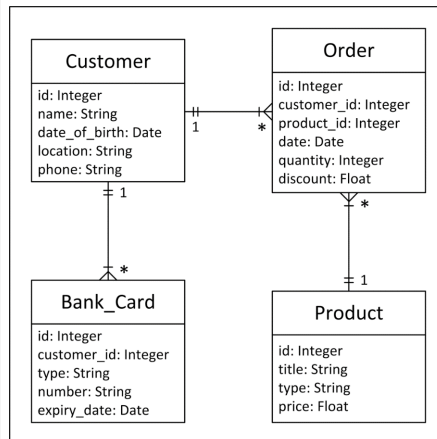
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Logical Data Models



Unlike simple and intuitive Conceptual Data Models, Logical Data Models usually use **special entity-relationship modeling** notations intended primarily for IT specialists and hardly understandable to most business stakeholders, e.g. UML. These diagrams provide **purely technical descriptions of data entities, or classes, and may contain peculiar storage-specific details or fields**.

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All new IT systems handling common data entities are expected to use standard definitions of these entities provided by Logical Data Models in their Designs

Logical Data Models shape the architectural requirements for all applications dealing with shared data

Logical Data Models help achieve logical consistency, enable interoperability and ease the integration between various IT systems

Compliance with Logical Data Models is typically achieved via peer-reviewing Designs of all IT systems and via supervising the IT project teams implementing these systems

The CSVLOD model of enterprise architecture



