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Avancier Methods (AM)

DOCUMENT

Architecture matrices and their uses

Matrices

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- An architecture description includes many types of architectural entity
- You can catalogue the instances of each architectural entity type
- You can show relationships between entities in **matrices**

Application / Role	CRM	ERP	Billing	Data Warehouse
PR officer	Uses services of			Uses services of
Salesman	Uses services of			Uses services of
1st line support	Uses services of		Uses services of	Uses services of
Fulfilment agent	Uses services of	Uses services of		

Application / Application	CRM	ERP	Billing	DW/BI
CRM			Depends on	
ERP	Depends on			
Billing	Depends on	Depends on		
DW/BI	Depends on	Depends on	Depends on	

Matrices as artefacts in a document framework

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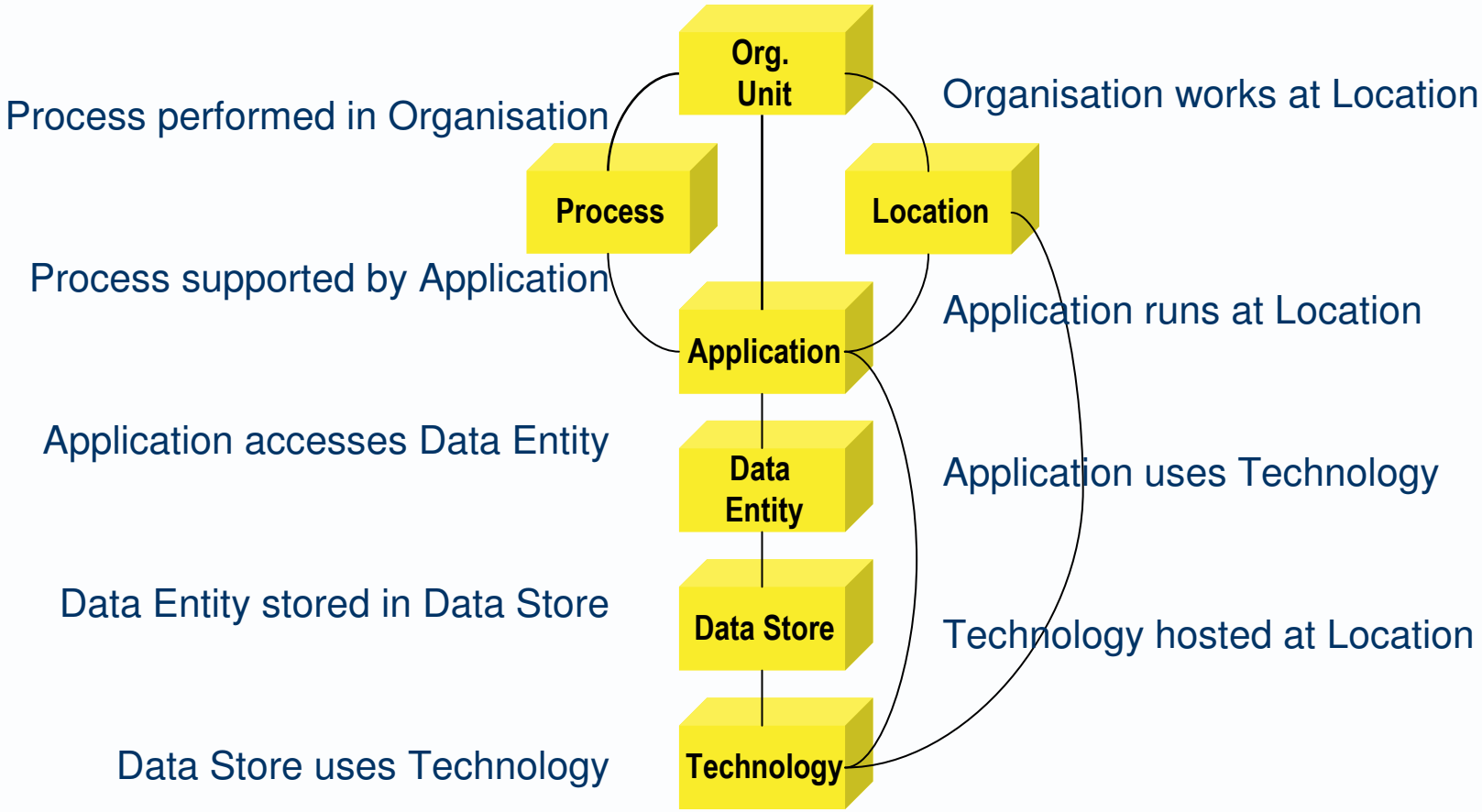
Architectural entities	POLDAT etc.
Architecture artefacts	**Catalogues** that list architectural entities with attributes
	Matrices that relate architecture entities
	Diagrams that describe and/or relate architectural entities
Architecture models and languages	e.g. ArchiMate, UML, AML
Management documents	Deliverables, work in progress or signed off. Often contain architecture artefacts
A meta model for an architecture repository	Defines architectural entities, their attributes and inter-relationships
Pre-defined classifications and reference models	Generalised taxonomies and common design patterns

Examples of relationships between entities



Inter-entity relationships as tables, grids or matrices

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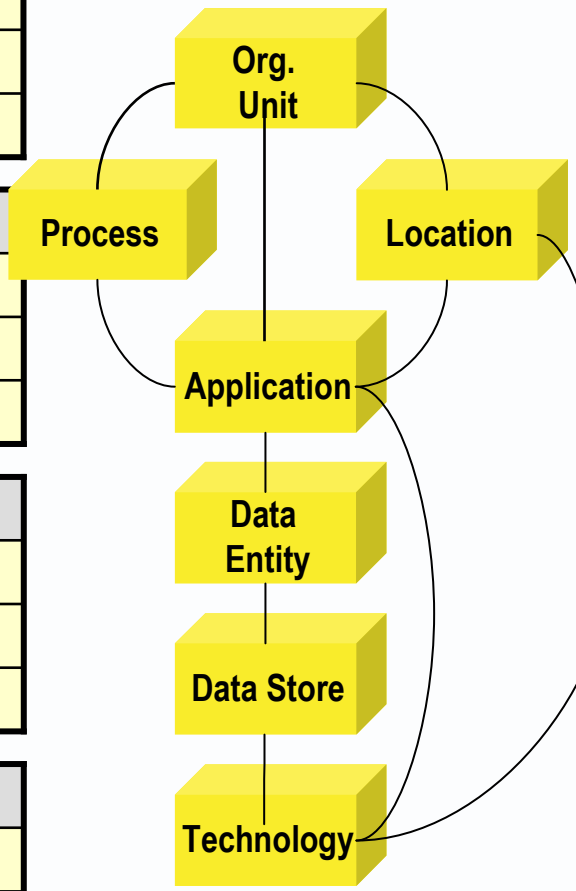
	Process	Process	Process
Org	Performs		
Org		Performs	Performs
Org			Performs

	Process	Process	Process
App	supports		
App		supports	supports
App			supports

	App	App	App
Entity	cru	rud	
Entity	crud	ru	r
Entity	r	crud	r

	Tech	Tech	Tech
Data store	uses		
Data store		uses	uses
Data store			



	Loc	Loc	Loc
Org	Works at		
Org		Works at	Works at
Org	Works at	Works at	

	Data Store	Data Store	Data Store
Entity	M	C	
Entity		M	C
Entity		M	C

	Tech	Tech	Tech
App	uses		
App		uses	uses
App			

Matrix uses

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- The matrices can be used for
  - Impact/Dependency analysis
  - Gap analysis
  - Traceability analysis
  - Cluster/Affinity analysis

Matrix uses: impact/dependency analysis

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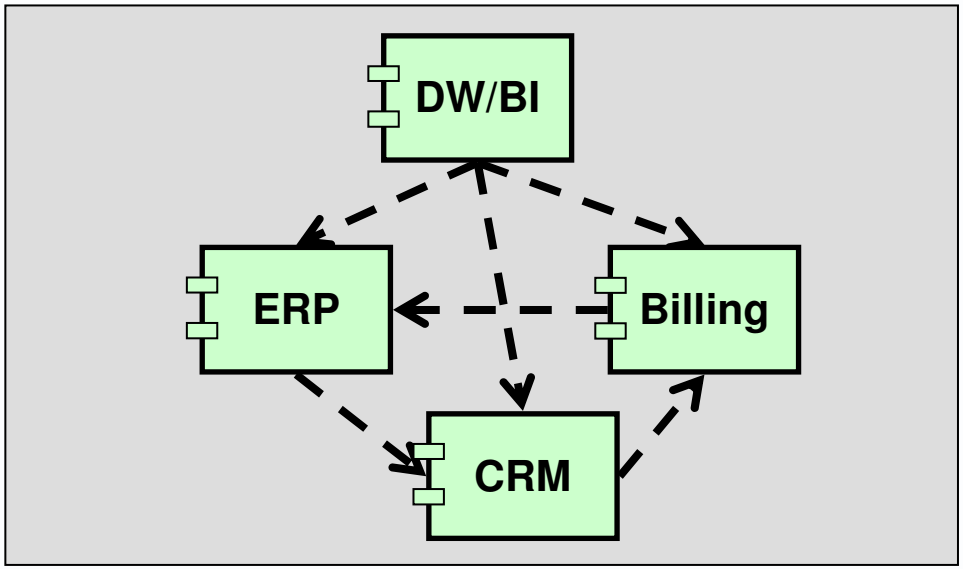
- Impact analysis implies recording dependencies, so you can follow mappings to check if a change to one item causes a change to related items.

Application Application	CRM	ERP	Billing	DW/BI
CRM			Depends on	
ERP	Depends on			
Billing	Depends on	Depends on		
DW/BI	Depends on	Depends on	Depends on	

- The same thing in UML



Matrix uses: gap analysis

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- You may want to compare
  - a vision with reality
  - a specification with an implemented solution
  - a baseline with a target

Target Apps / Baseline Apps	Billing	CRM	Business Intelligence	Baseline to be dropped
Billing	Ported to new platform			
CRM		Left as is		
Resourcing				Dropped (accidentally)?
Target to be introduced			New (bought or built?)	

Matrix uses: traceability analysis

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- Traceability records usually cross-refer items in a requirements configuration to items in a solution configuration.

Solution items / Requirements	Business Intelligence	Sales mobile device	CRM	Requirements that have no solution
Faster Ordering		Satisfied by		
Remote Working		Satisfied by		
Better Forecasts	Satisfied by			
Lower Sale Cost				No solution
Solution items that have no requirement			No requirement	

- Note that in test-driven development you map
  - requirements to test cases
  - test cases to solution components

Matrix uses: cluster analysis

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- This means mapping data to activity
- This can be done at different levels, and in different ways.

Activity / Data	Billing	Delivery	Sales	Reporting
Customer	R	R	C	R
Order	R	R	C	R
Delivery	R	C		R
Invoice	R	C		R
Payment	C			R
Report				C

- Use the NW corner method to sort rows and columns of a use-to-data matrix
- This suggests the boundaries of data stores

Activity / Data	Sales	Delivery	Billing	Reporting
Customer	C	R	R	R
Order	C	R	R	R
Delivery		C	R	R
Invoice		C	R	R
Payment			C	R
Report				C

Matrix uses: summary

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- Impact/Dependency analysis
  - To find the effects of a change
- Gap analysis
  - To find potentially missing items
- Traceability analysis
  - To check deliverables meet goals and solutions solve problems.
- Cluster/Affinity analysis
  - To group closely-coupled items into encapsulated components

Matrices that appear in AM

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Avancier Methods: Artefact (Viewpoint) Library			
Architecture Domain	**Catalogues**	**Matrices**	**Diagrams**
Context	Driver/Goal/Objective catalogue Driver or concern catalogue Stakeholder catalogue Aim (goal/objective/requirement) catalogue Directive (principle/policy/rule) catalogue Technology Standards catalogue Regulations catalogue	Goal or requirements traceability matrix	Value Chain diagram Solution Concept diagram Context diagram
Business	Organization/Role/Actor catalogue Role catalogue Actor catalogue Business Service/Function catalogue Product, goods or service catalogue Location catalogue Location type catalogue Process/Event/Control/Product catalogue Contract/Measure catalogue Service Level Agreement Business Service Measurable Qualities Business term or rule catalogue	Business Interaction matrix Actor/Role matrix Organisation to location matrix Organisation to activity matrix Business process to use case matrix	Business Footprint diagram Business Service/Information diagram Functional Decomposition diagram Goal/Objective/Service diagram Product Lifecycle diagram Business Use-Case diagram Organization Decomposition diagram Process Flow diagram Event diagram Business process map diagram Business goods and services flow diagram Location map diagram Location communication paths diagram
Data	Data Entity/Data Component catalogue Data Component catalogue Data Entity catalogue Data Item catalogue	Data Entity/Business Function matrix Application/Data matrix Data Dissemination matrix	Conceptual Data diagram Logical Data diagram Data Dissemination diagram Data Lifecycle diagram Data Security diagram Data Migration diagram Data access path (short-term process) diagram Data flow structure (regular expression) diagram
Applications	Application Portfolio catalogue Interface catalogue Data Flow catalogue UIs and APIs that offer services Application use case catalogue	Application/Organization matrix Role/Application matrix Application/Function matrix Application Interaction matrix Application/Activity matrix	Application Communication diagram Application and User Location diagram Application Use-Case diagram Enterprise Manageability diagram Process/Application Realization diagram Application Migration diagram
Infrastructure	Technology Standards catalogue Technology Portfolio catalogue Client device catalogue Server device catalogue Platform services catalogue Channel catalogue	Application/Technology matrix Data component/Technology matrix	Environments and Locations diagram Platform Decomposition diagram Processing diagram Networked Computing/Hardware diagram Communications Engineering diagram

And other matrices you might one day find useful

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Application > communicates with > Application
Application > consumes or produces > Data flow
Application > encapsulates > Data Store
Application > is implemented using > Technology
Application > provides > IS Service

Business function > communicates with > Business function
Business function > executes some or all of > Business process
Business function > provides > Business service

Business process > consumes or produces > Data flow
Business process > involves > External entity
Business process > is guided by > Business rule
Business process > connects > Business function
Business process > contributes to > Business Service

Data Entity > is created or used by > Application
Data Entity > is created or used by > Business Function
Data Entity > is created or used by > IS Service
Data Entity > relates to > Data Entity

Data Store > holds > Data Entity

Driver > is motivation for > Aim
Driver > is motivation for > Directive

External entity > accesses or uses > Business function
External entity > consumes or produces > Business service
External entity > consumes or produces > IS service

Interface > provides > Service
Interface > provides access to > Application
Interface > provides access to > Business function
Interface > provides access to > Technology

Location > contains > Application
Location > contains > Data Store
Location > contains > External entity
Location > contains > Organization Unit
Location > contains > Technology

Organization Unit > employs > Role
Organization Unit > produces > Business service
Organization Unit > supports > Business function

Quality or NFR > applies to > Interface
Quality or NFR > applies to > Service

Service > consumes or produces > Data Flow

Technology > communicates with > Technology
Technology > enables > Application
Technology > supplies > Platform Service

Every entity relationship model implies a set of matrices

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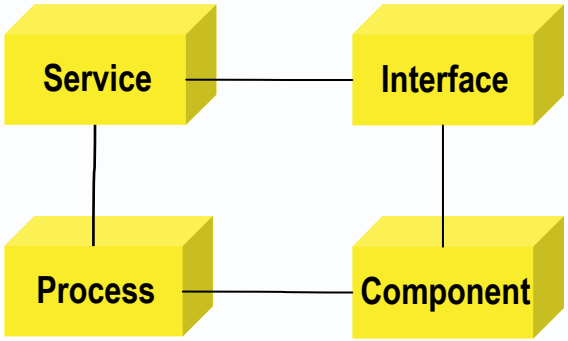
External view	Interface	Interface
Service	Accessed via	
Service		

Behavioural view	Service	Service
Process	delivers	
Process		delivers



Structural view	Interface	Interface
Component	Offers	
Component		

Internal view	Component	Component
Process	Executed by	
Process		

Many matrices map structure to behaviour

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GENERAL	Structural entity	Structural entity
Behavioural entity	Related to	
Behavioural entity		

Grammar	Noun	Noun
Verb	Action	
Verb		

IE and TOGAF	Data entity	Data entity
Function	CRUD	
Function		

REST	Domain name	Domain name
http operation	Action	
http operation		

SSADM	Entity	Entity
Event	Has effect on	
Event		

UML sequence diagram	Object	Object
Operation	Invoked in	
Operation		

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