



Using the eArchiving Capability Maturity Model

eArchiving Initiative Webinar Series

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Agenda

- A primer on maturity models
- The eArchiving Capability Maturity Model (eACMM)
 - Introduction
 - Development strategy
 - Capabilities
 - Assessment method and service
 - Example findings

A Primer on Maturity Models (concept)

A **Maturity Model** is a technique that is proved to be valuable to measure a certain aspect of an organisation. It represents a path towards increasingly organised and systematic way of “doing things” in organisations.

A Primer on Maturity Models (maturity concept)

Typically, maturity models are staged models that consist of a set of maturity levels (the number of maturity levels is specific to each model). Each maturity level can be decomposed into:

- (1) Dimensions and sub-dimensions;
- (2) Elements;
- (3) Attributes; etc.

Usually, the result of a maturity model is a **single maturity level**.

A Primer on Maturity Models (metaphor)

Using the “driving” ability of a human being



Level 1

No precise direction, several accidents ...



Level 2

Licensed to drive but limited to a “young driver” insurance



Level 3

Automatic driving instincts (velocity, braking distance, obstacle avoidance, ...)



Level 4

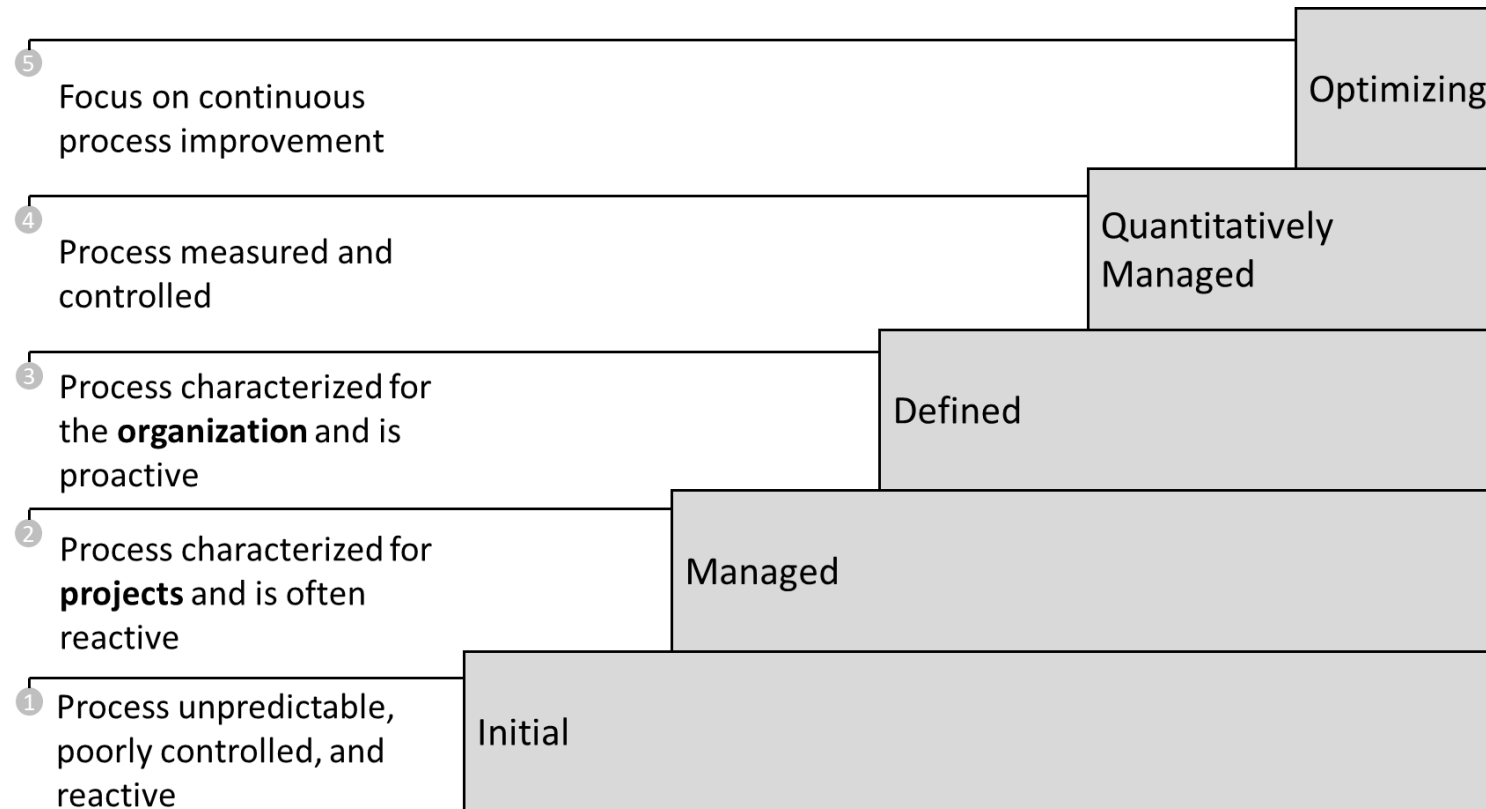
Driving metrics in place (impact of trajectory divergence, weather, ...)



Level 5

Performance Innovation (new technology in tyres, aerodynamics, fuel, ...)

A Primer on Maturity Models (example)

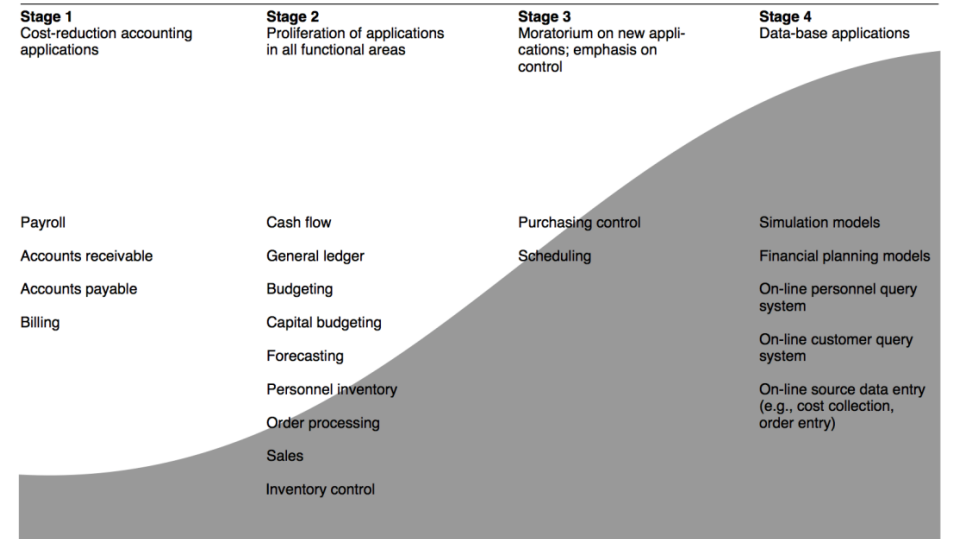


(D. M. Ahern, A. Clouse, R. Turner. "CMMI Distilled: A Practical Introduction to Integrated Process Improvement, Third Edition". Addison Wesley Professional, 2008.)

A Primer on Maturity Models (history)

- In 1974 R. L. Nolan proposed four stages of growth for the IT department
- Nolan's work was then adopted and further developed by several authors:
 - McFarlan – Phases of assimilation based on Nolan's work;
 - Sullivan – Reviewed McFarlan's Model;
 - Earl – Based on Sullivan's Model;
 - Galliers – Based on Earl's Model.

Stages of growth: (1) Initiation... (2) Expansion... (3) Formalisation and... (4) Maturity



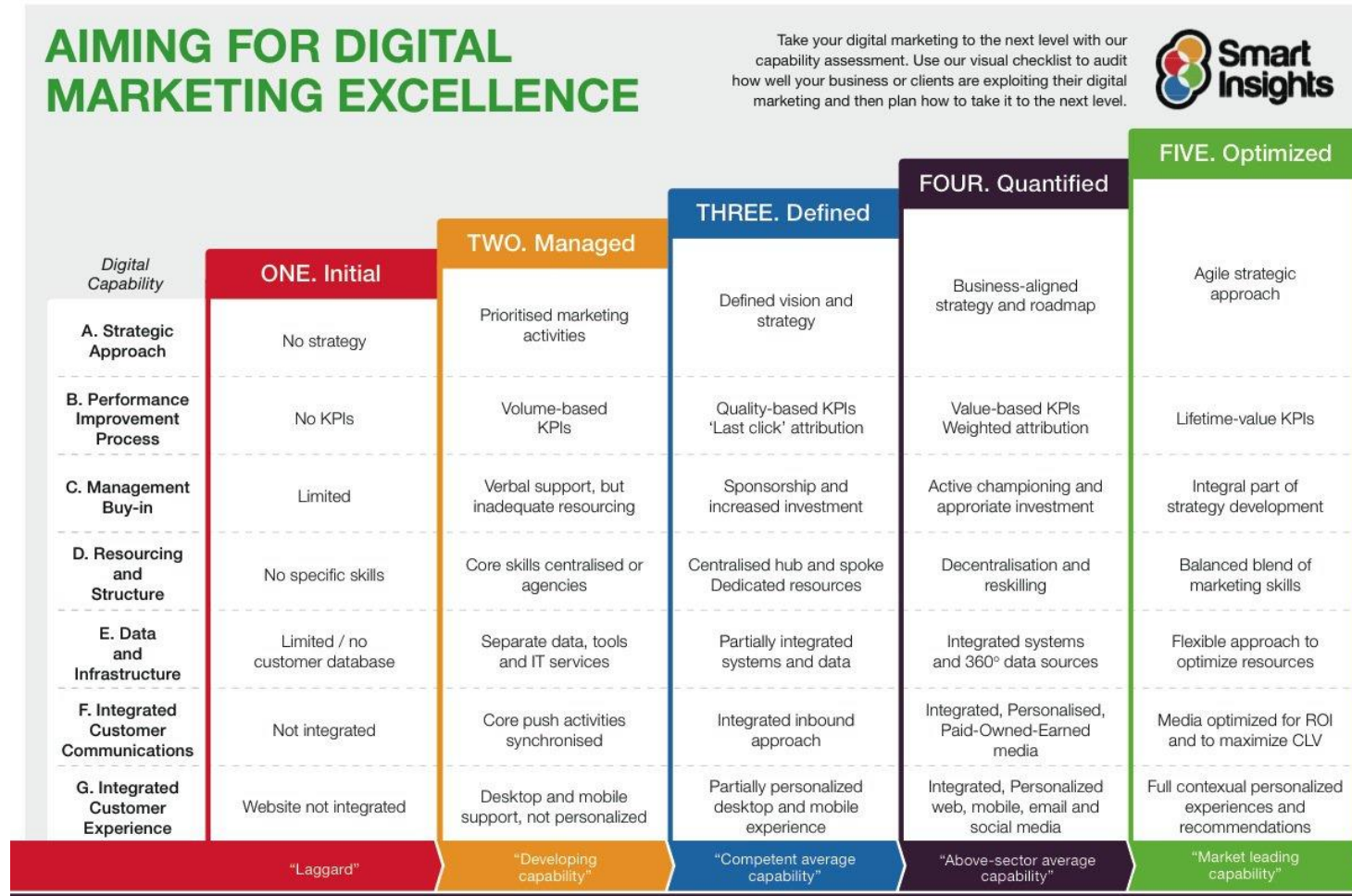
(Source: C. F. Gibson, R. L. Nolan, "Managing the Four Stages of EDP Growth")

A Primer on Maturity Models (capability concept)

- **Concept: Capability** Maturity Models (Continuous Models)
 - Consist of a set of **capability** levels (capability = what things can we do...);
 - Relevant for “process maturity” (process = established rules for how should we do things ...).

In capability maturity models the result is a **series of capability levels, one for each capability being assessed.**

A Primer on Maturity Models (capability concept – example)



A Primer on Maturity Models (motivation)

1. It allows for flexible performance monitoring;
2. Can help identify areas where organisations are not operating as desired;
3. Allows to determine strategies that can improve their operation and processes;
4. Emphasises learning and improvement;
5. By identifying the current maturity level, the model can reveal what needs to change to move to the next level.

A Primer on Maturity Models (assessment)

A maturity assessment can be performed:

1. As a self-assessment;
2. Following an appraisal method such as:
 - a) ISO/IEC TS 33030:2017 – An exemplar documented assessment process;
 - b) SEI SCAMPI for CMMI:
 - i. CMMI stands for Capability Maturity Model Integration;
 - ii. SCAMPI stands for Standard CMMI Appraisal Method for Process Improvement.
 - c) ...

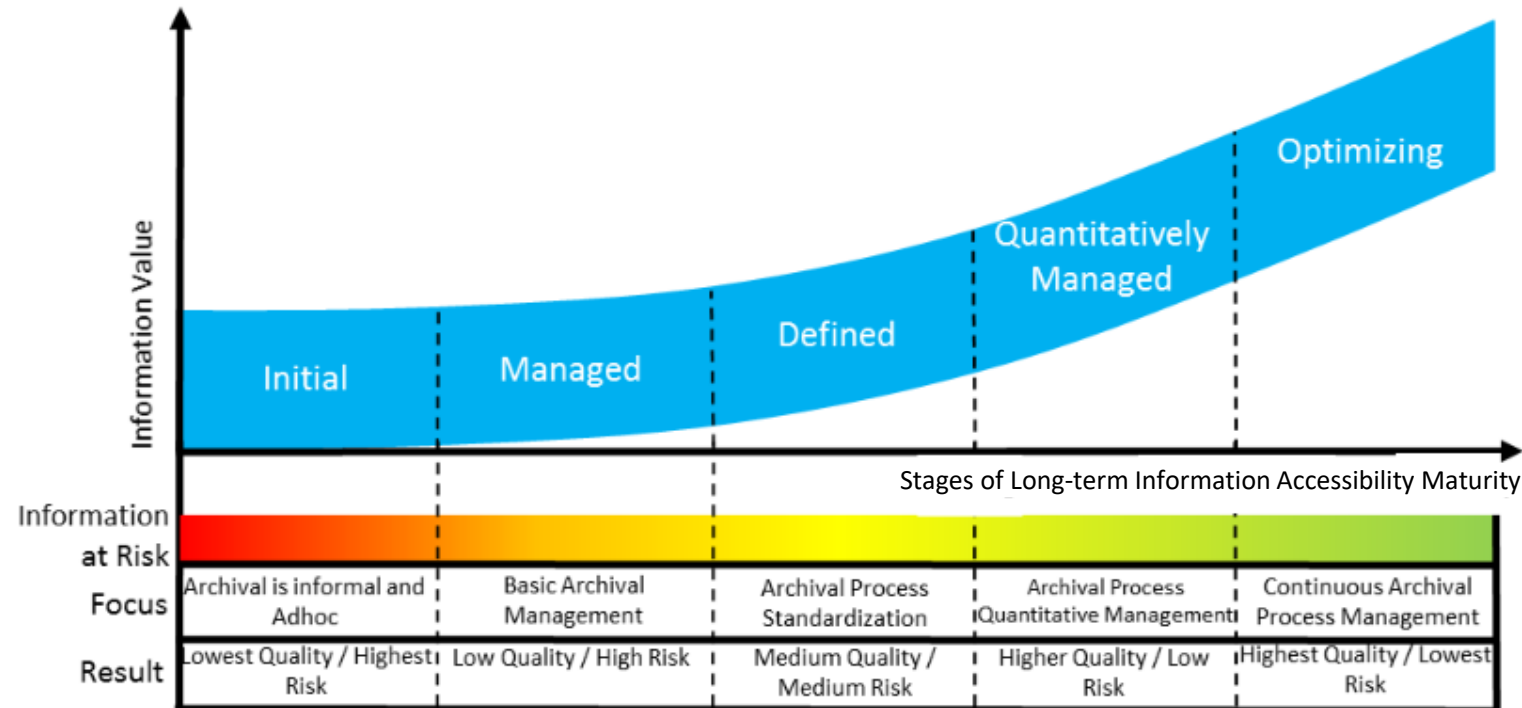
A Primer on Maturity Models (conclusion)

The eArchiving Capability Maturity Model (eACMM):

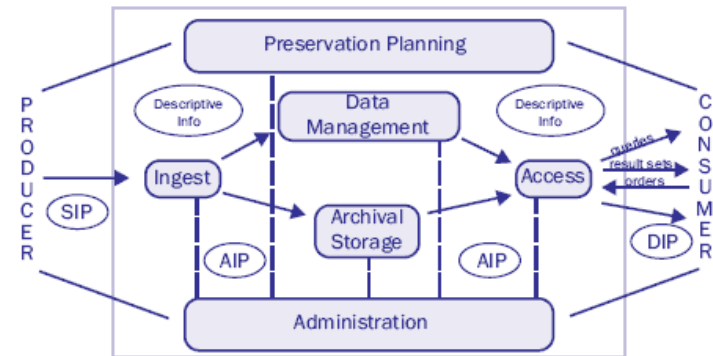
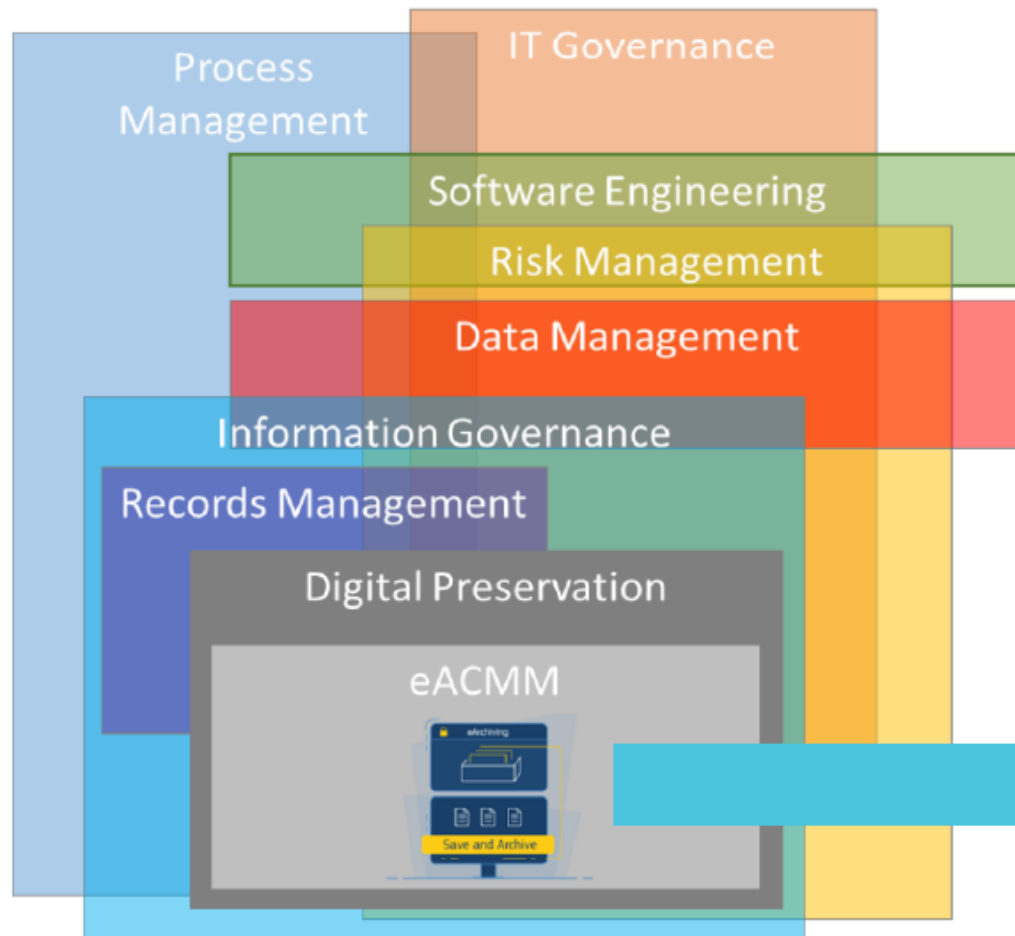
1. Is a Capability Maturity Model (Continuous model);
2. Has a self-assessment method.

eArchiving Capability Maturity Model (introduction)

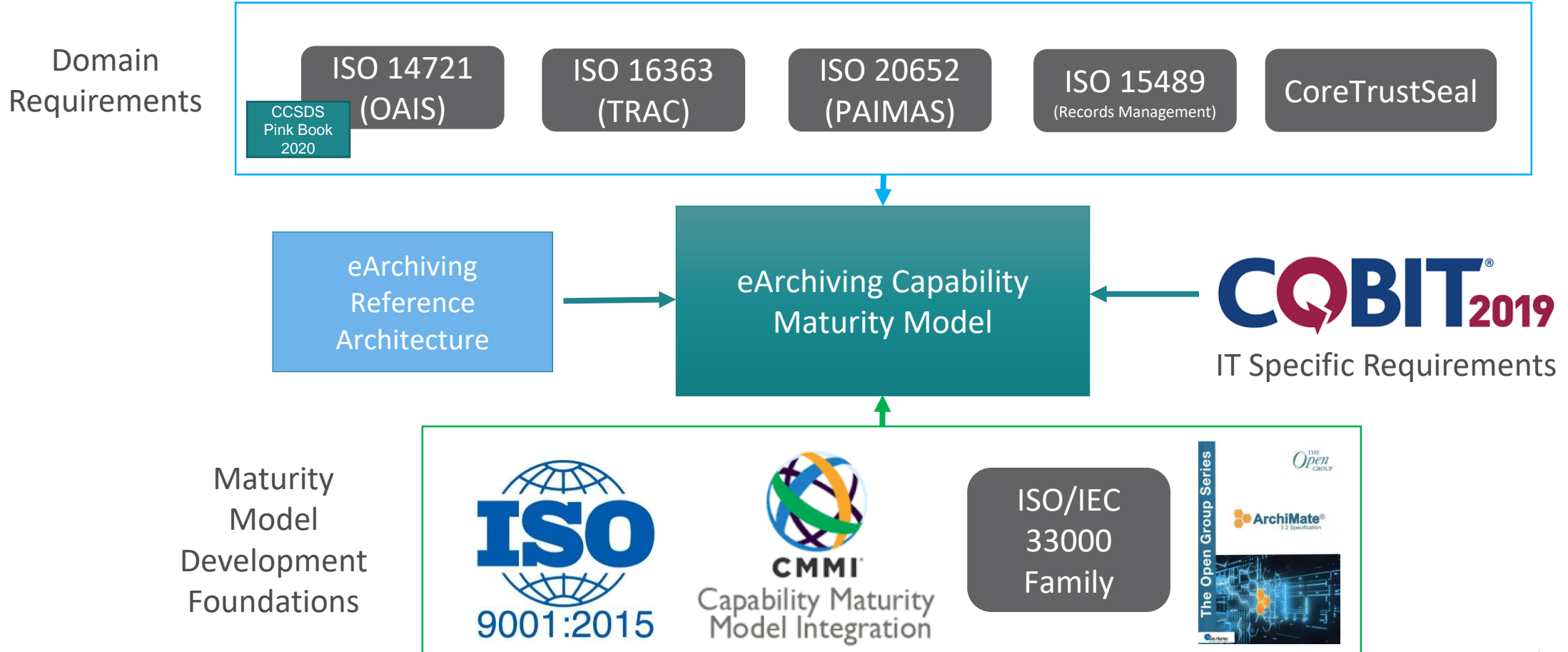
The eArchiving Capability Maturity Model expresses a path towards an increasingly organised and systematic way of deploying digital archiving and preservation capabilities in organisations.



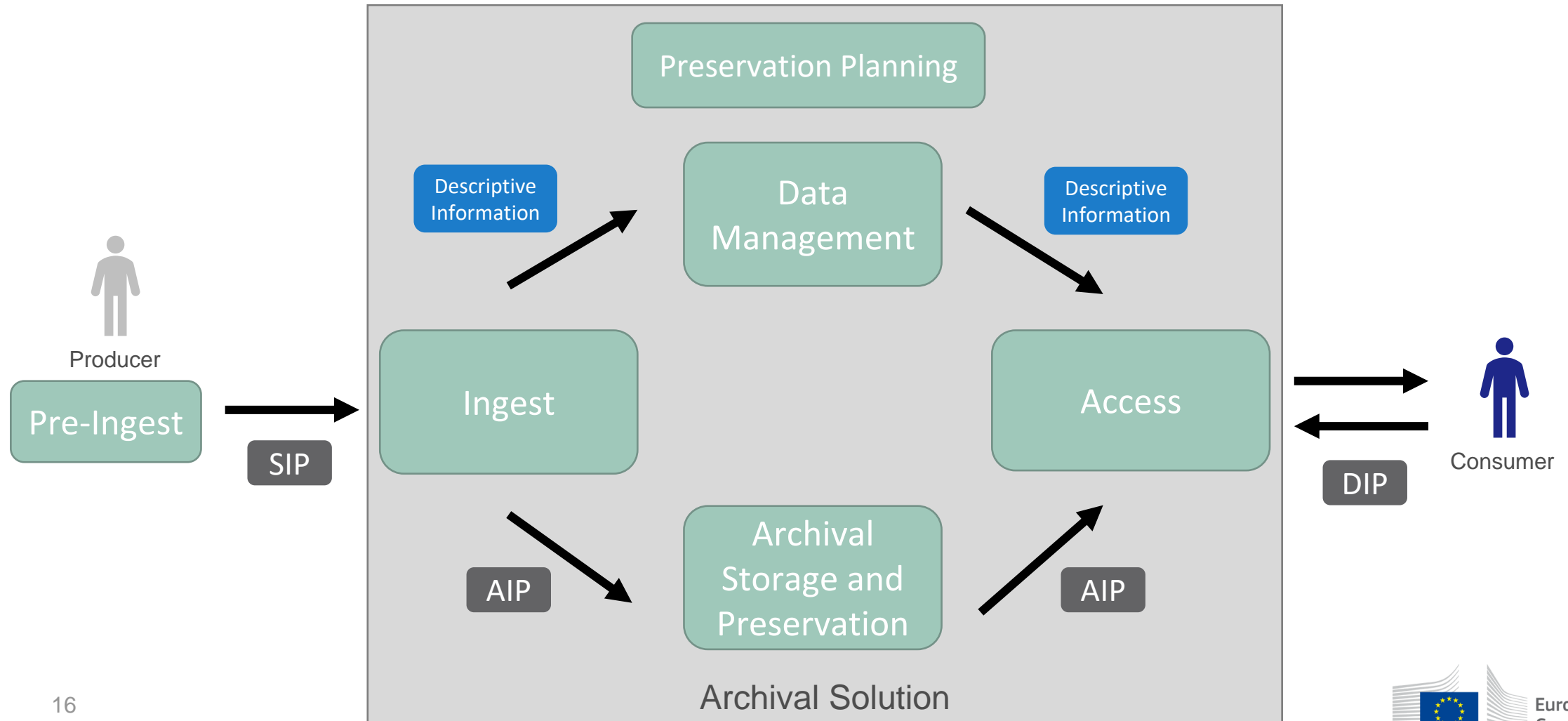
eArchiving Capability Maturity Model (domain positioning)



eArchiving Capability Maturity Model (development strategy)



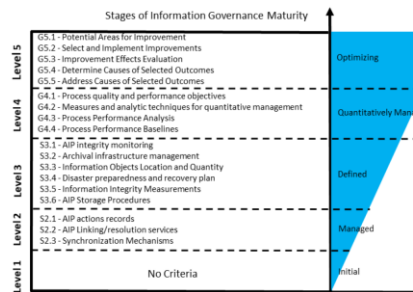
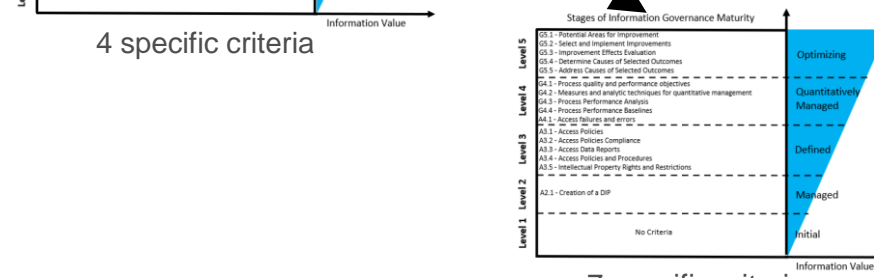
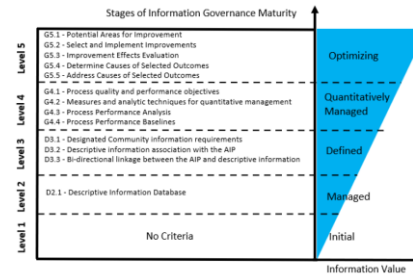
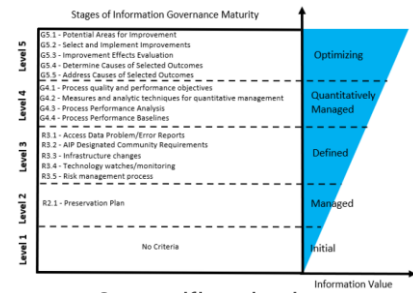
eArchiving Capability Maturity Model (capabilities)



eArchiving Capability Maturity Model (capabilities)

- **Ingest:** “(...) covers archival activities of creating the archival information package (AIP) from the submission information package (SIP).”
- **Archival Storage and Preservation:** “(...) services and functions used for the storage and retrieval of Archival Information Packages.”
- **Data Management:** “(...) collection of independent processes that aim to manipulate the descriptive metadata (and in some implementations the inner structure of the AIP) theoretically resulting in a new manifestation or new version of the AIP.”
- **Access:** “(...) covers the activities of requesting and creating the Dissemination Information Package (DIP) from the AIP.”
- **Preservation and Accessibility Planning:** “(...) provides the services and functions for monitoring the environment of the OAIS and which provides recommendations and preservation plans to ensure that the information stored in the OAIS remains accessible to, and understandable by, and sufficiently usable by, the Designated Community over the Long Term, even if the original computing environment becomes obsolete.”

Capability Maturity Model (Capabilities)

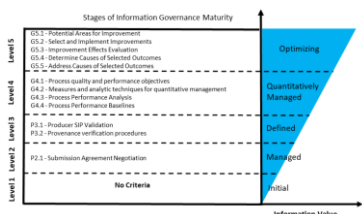


Descriptive Information

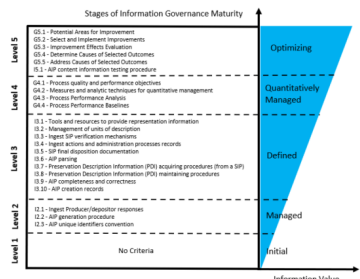
Descriptive Information



Producer



SIP



AIP



Consumer

DIP

AIP

Capability Maturity Model (capabilities)

47 specific criteria

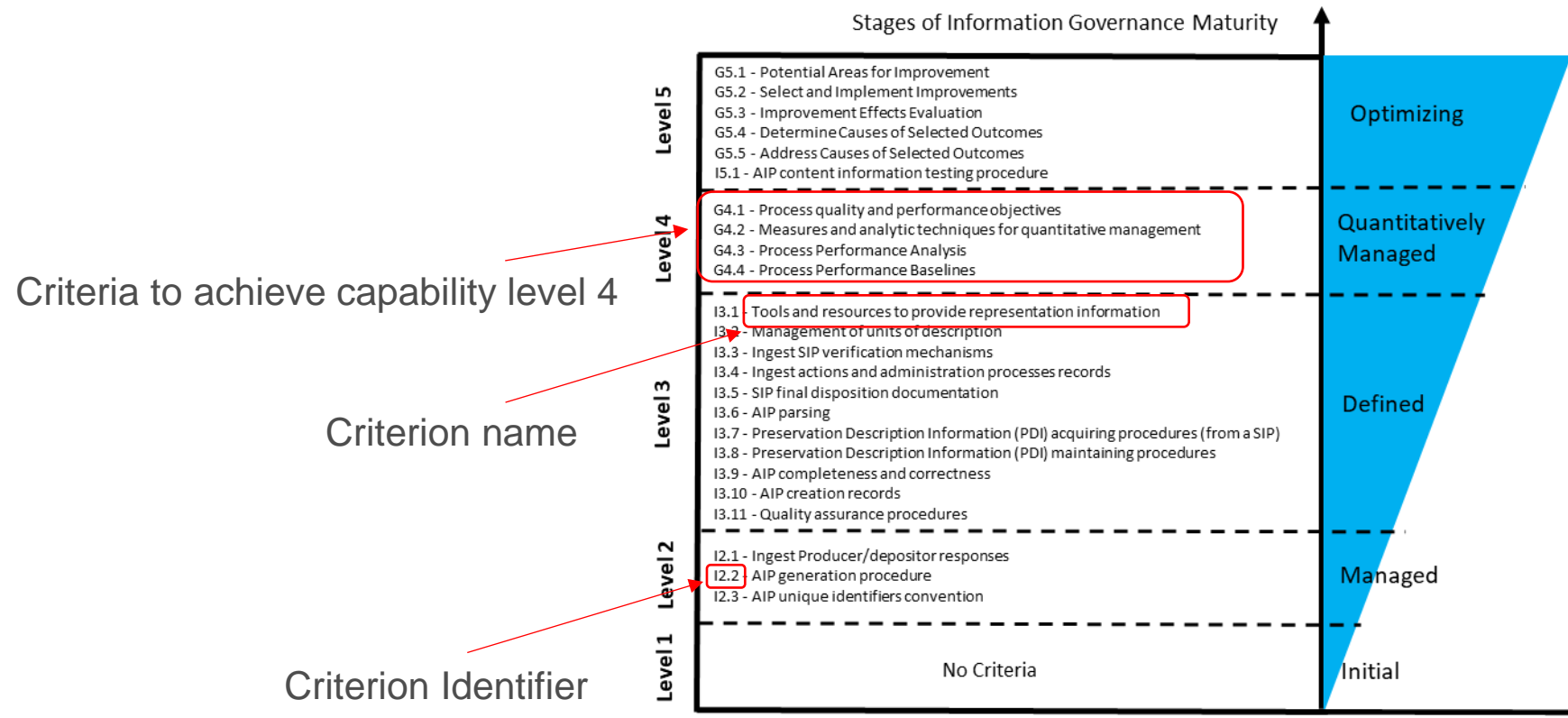
+

9 general criteria

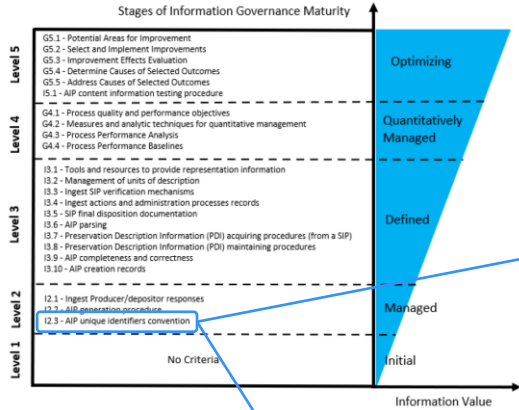
The general criteria assess capability levels 4 and 5 of eACMM.

The questions are based on the process areas of CMMI for maturity levels 4 and 5.

eArchiving Capability Maturity Model (ingest capability)



eArchiving Capability Maturity Model (questionnaire)



ID	I2.3
Title	AIP unique identifiers convention
Question	Is there a procedure to generate and manage persistent and unique identifiers for an AIP?
Purpose	The purpose is to identify if the organization generates persistent, unique identifier for each AIP so that an IAP can be found in the future. This also ensures that an AIP can be distinguished from all other AIP in the repository. Understand if the organization has records that detail how changes to unique identifiers are to be performed so that AIP don't lose context, are not lost and can be distinguished from all other AIP in the repository.
Notes	Examples of evidence to demonstrate this can be documentation describing naming conventions and physical evidence of its application (e.g., logs).
eArchiving RA Mapping	Views -> 03 Maturity Model views -> 02 Ingest -> Generate AIP
Terms	-
Answers	No: There is no procedure to generate and manage persistent and unique identifiers for an AIP. Yes: There is a procedure to generate and manage persistent and unique identifiers for an AIP.
Source	TRAC – Criterion 4.2.4 [6]

eArchiving Capability Maturity Model (reference architecture)

The eArchiving Reference Architecture aims to support institutions to implement or improve digital archiving operations by describing the most crucial motivation, strategy, business and infrastructure components.

It allows institutions to understand more easily what and why they want to achieve with their digital archive, and help implementing suitable processes and infrastructure.

If you wish to know more, you can watch the webinar available at <https://www.e-ark-foundation.eu/the-earchiving-reference-architecture/>

The latest version of the Reference Architecture (V2.0) is available at <https://kc.dlmforum.eu/earchiving-ra20/>

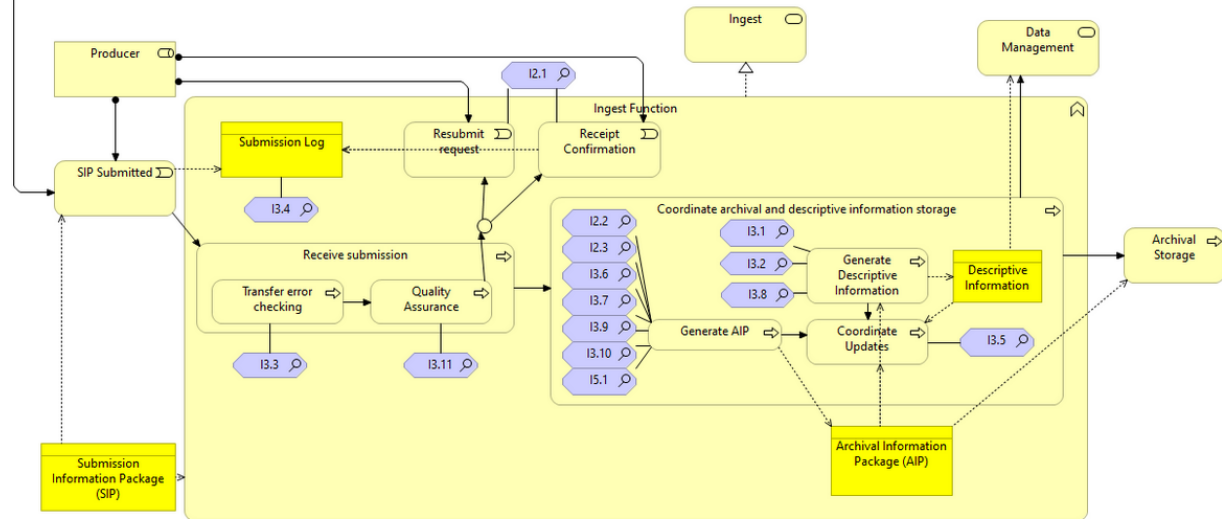
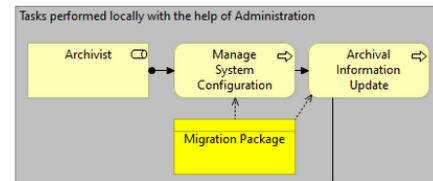
eArchiving Capability Maturity Model (reference architecture)

eArchiving Reference Architecture v2.0



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 - ▶ 02 Example scenarios
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 - 02 Ingest
 - 03 Access
 - 04 Preservation and accessibility planning
 - 05 Data Management
 - 06 Archival Storage
 - ▶ 04 Archiving by Design views
- ▶ Reference



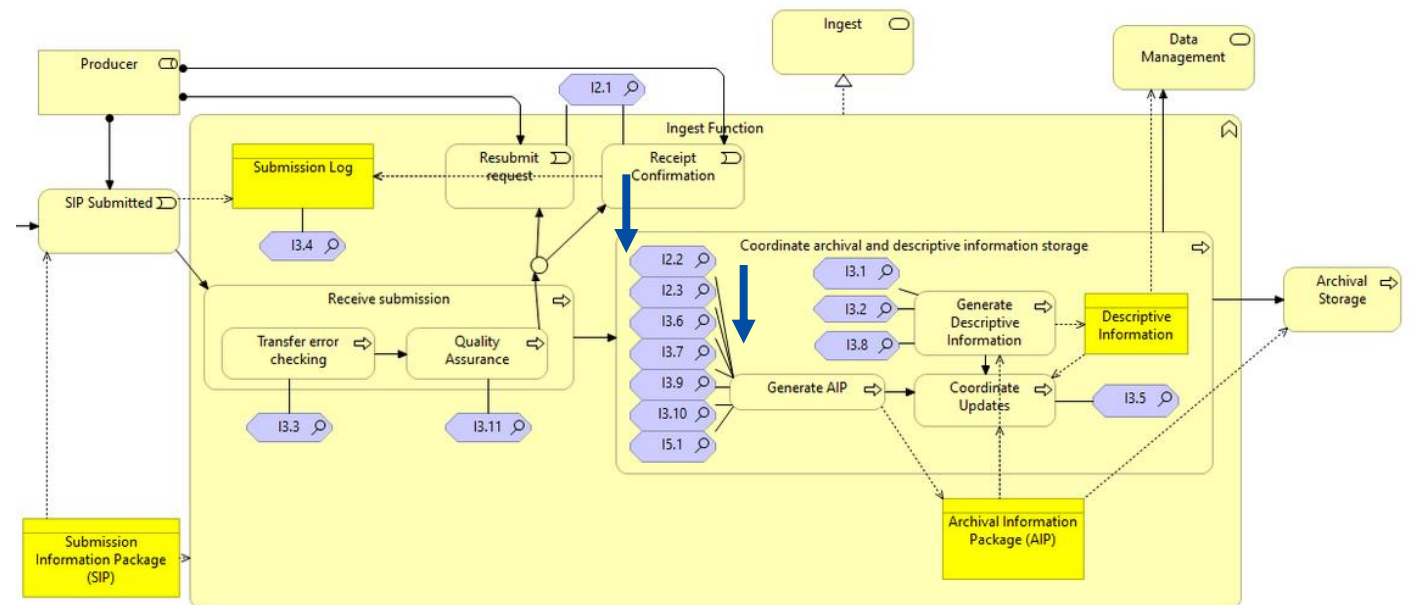
Select an element in the model tree or in a view to show its details here

eArchiving Capability Maturity Model (reference architecture)

eACMM Question

ID	I2.3
Title	AIP unique identifiers convention
Question	Is there a procedure to generate and manage persistent and unique identifiers for an AIP?
Purpose	The purpose is to identify if the organization generates persistent, unique identifier for each AIP so that an IAP can be found in the future. This also ensures that an AIP can be distinguished from all other AIP in the repository. Understand if the organization has records that detail how changes to unique identifiers are to be performed so that AIP don't lose context, are not lost and can be distinguished from all other AIP in the repository.
Notes	Examples of evidence to demonstrate this can be documentation describing naming conventions and physical evidence of its application (e.g., logs).
eArchiving RA Mapping	Views -> 03 Maturity Model views -> 02 Ingest -> Generate AIP
Terms	-
Answers	No: There is no procedure to generate and manage persistent and unique identifiers for an AIP. Yes: There is a procedure to generate and manage persistent and unique identifiers for an AIP.
Source	TRAC – Criterion 4.2.4 [6]

eArchiving Reference Architecture



eArchiving Capability Maturity Model (documents and tools)

<http://kc.dlmforum.eu/eark-products>

E-ARK Products



The DILCIS Board

The Digital Information LifeCycle Interoperability Standards Board (DILCIS Board) develops, publishes and supports standards which provide practical interoperability in digital archiving



eArchiving Reference Architecture v2.0

This reference model of digital archiving has been created by the CEF eArchiving Building Block in cooperation with the E-ARK Consortium.



eArchiving Capability and Maturity Model v2.2 (.ZIP file)

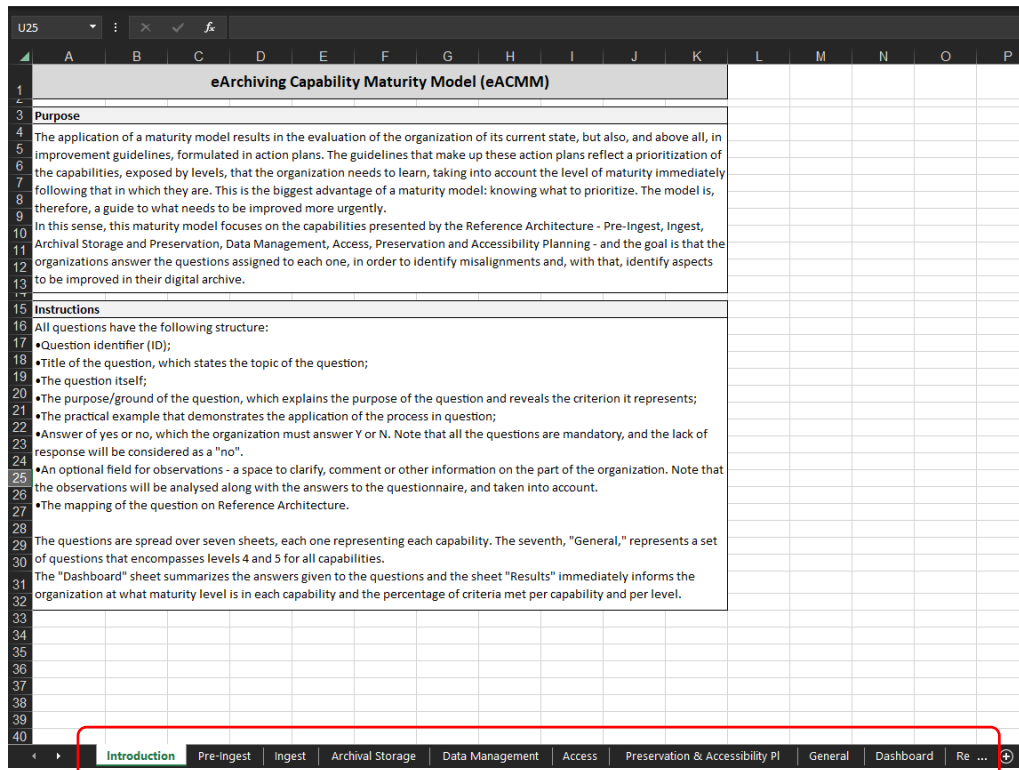
The eArchiving Capability and Maturity Model is an instrument for organisations to conduct a self-assessment and guide them regarding their capability on the core individual digital preservation process areas (namely, pre-ingest, ingest, preservation planning, data management, archival storage and access).

Previous Versions:

- eArchiving Reference Architecture v1.0 (deprecated)
- E-ARK General Model (deprecated)
- eArchiving Capability and Maturity Model v1.0 (.ZIP file) (deprecated)

eArchiving Capability Maturity Model (documents and tools)

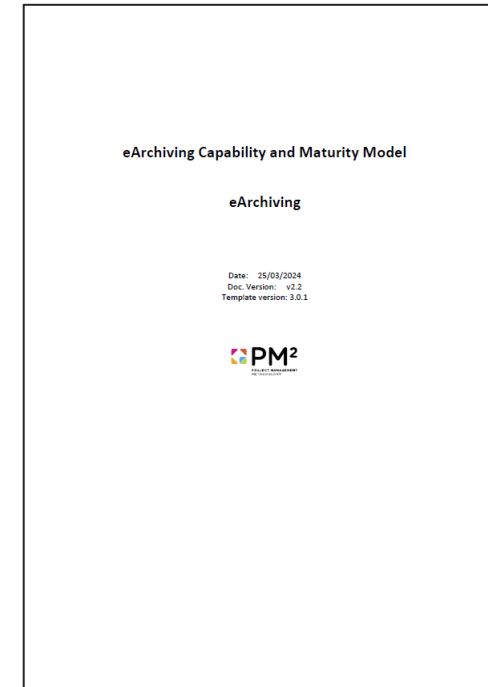
Excel File with Questionnaire



26

Instructions, capabilities and result dashboards

PDF Document



Section 6 details on how to use the questionnaire

eArchiving Capability Maturity Model (documents and tools)

Excel File with Questionnaire

	A	B
1	<i>P2.1 - Submission Agreement Negotiation</i>	
2	Is there a procedure to negotiate the terms of the submission agreement the Producer and the Archive?	
3	<p>Purpose: The purpose is to identify if the Archive can negotiate the terms of the submission agreement with Producers. Terms of agreement might include the specification of the metadata that must be included at the time of submission, the schedule and method of submission, the responsibilities of the Producer and the Archive regarding the information being ingested, among other examples.</p> <p>Notes: An example of evidence to demonstrate is the documentation of the procedure to negotiate the terms of the submission agreement between the Producer and the Archive.</p> <p>eArchiving Reference Architecture Mapping: Views -> 03 Business Layer -> 01 Pre-Ingest -> Negotiate Submission Agreement</p>	
4	Answer ("Y" for yes, "N" for no)	Y
5	Observations <i>(in case there are some comments to your answer that you would like to share, please add them below)</i>	
6		
7		
8		
9	<i>P3.1 - Producer SIP Validation</i>	
10	Does the Archive validate if the Producer SIP complies with the defined format and structure specifications?	
11	<p>Purpose: The purpose is to identify if the Archive validates the Producer SIP regarding format and structure. If the SIP has deviations the Archive might reject the SIP and request the Producer to deliver a corrected SIP.</p> <p>Notes: Examples of evidence to demonstrate this can be the logs of the validation procedures; documentation of the validation procedures, among others.</p> <p>eArchiving Reference Architecture Mapping: Views -> 03 Business Layer -> 01 Pre-Ingest -> Prepare submission</p>	
12	Answer ("Y" for yes, "N" for no)	N
13	Observations <i>(in case there are some comments to your answer that you would like to share, please add them below)</i>	
14		
15		
16		

Capability / Aspect	Level	Question	Answer	Count	Criteria met?	Points	
Pre-Ingest	2	P2.1	Y	1	YES	1	
	3	P3.1	N	0	NO	0	
		P3.2	N	0	NO	0	
Ingest	2	I2.1	Y	2	NO	1	
		I2.2	N			0	
		I2.3	Y			1	
		I3.1	Y			1	
	3	I3.2	Y	7	NO	1	
		I3.3	N			0	
		I3.4	N			0	
		I3.5	Y			1	
		I3.6	Y			1	
		I3.7	Y			1	
Archival Storage & Preservation	2	I3.8	Y	3	YES	1	
		I3.9	N			0	
		I3.10	Y			1	
	3	I5.1	Y	1	YES	1	
		S2.1	Y	5	NO	1	
		S2.2	Y			1	
		S2.3	Y			1	
		S3.1	Y			1	
		S3.2	Y			1	
		S3.3	N			0	
S3.4	Y	1					
Data Management	2	D2.1	Y	1	YES	1	
	3	D3.1	N	1	NO	0	
		D3.2	N			0	
Access	2	A2.1	Y	1	YES	1	
		A3.1	N	1	NO	0	
		A3.2	Y			1	
	A3.3	N	0				
	3	A3.4	N	1	NO	0	
		A3.5	N			0	
		A4.1	Y			1	YES
R2.1		Y	1			YES	1

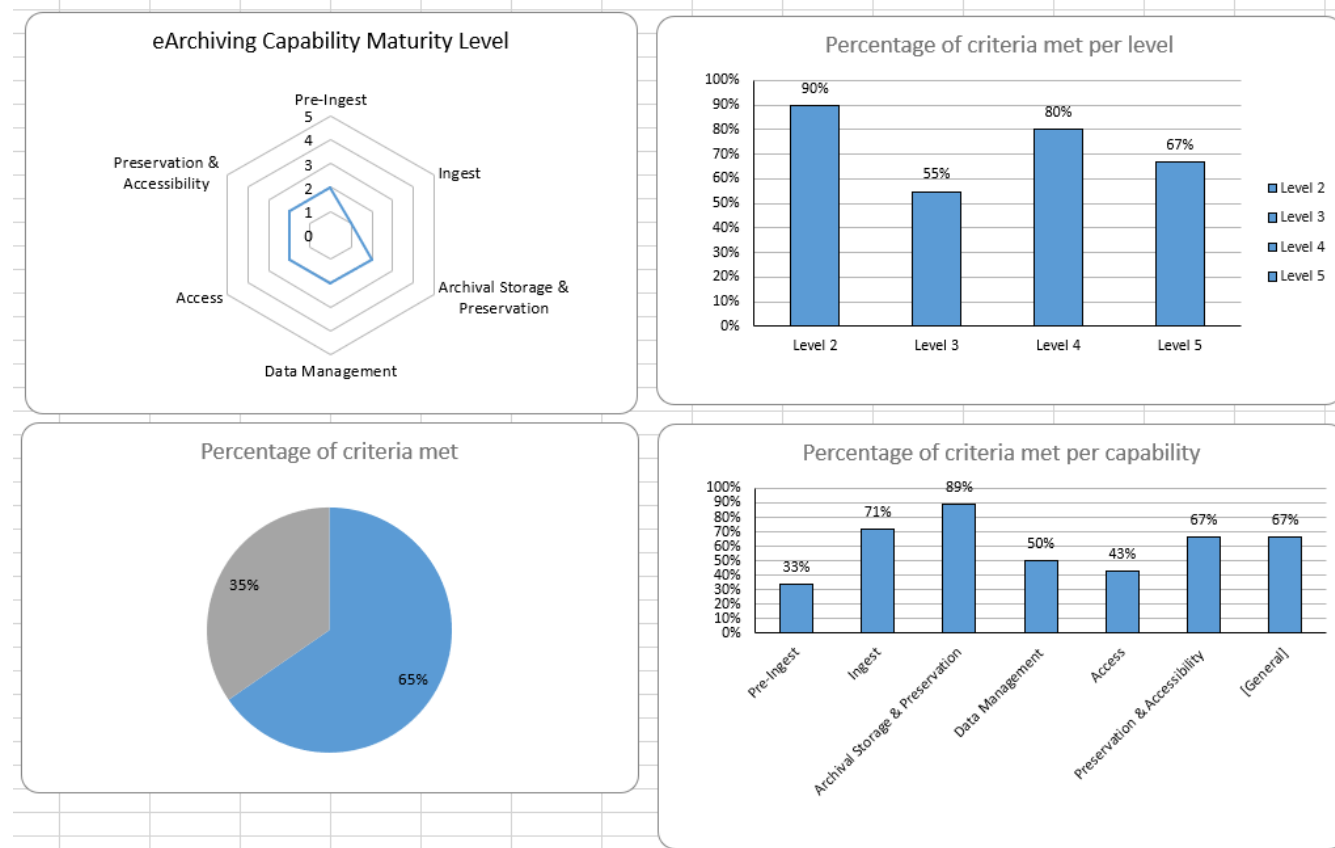
Capability	Level	Levels	Percentage	Count
Pre-Ingest	2	Level 2	90%	9
	1	Level 3	55%	17
Archival Storage & Preservation	2	Level 4	80%	4
	2	Level 5	67%	4
Access	2			
Preservation & Accessibility	2			

Criteria met	Percentage	Count
Criteria met	65%	34
Negative responses	35%	18

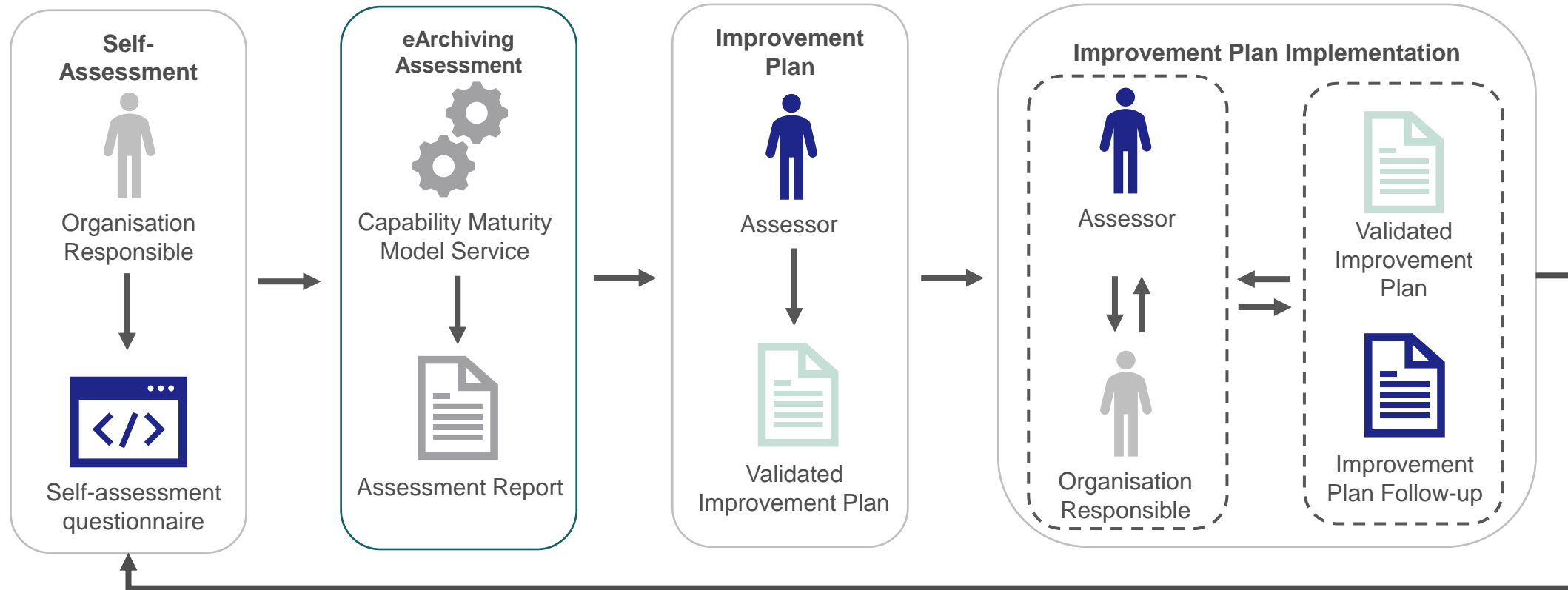
Capability	Percentage	Count
Pre-Ingest	33%	1
Ingest	71%	10
Archival Storage & Preservation	89%	8
Data Management	50%	2
Access	43%	3
Preservation & Accessibility	67%	4
[General]	67%	6

eArchiving Capability Maturity Model (documents and tools)

Excel File with Questionnaire

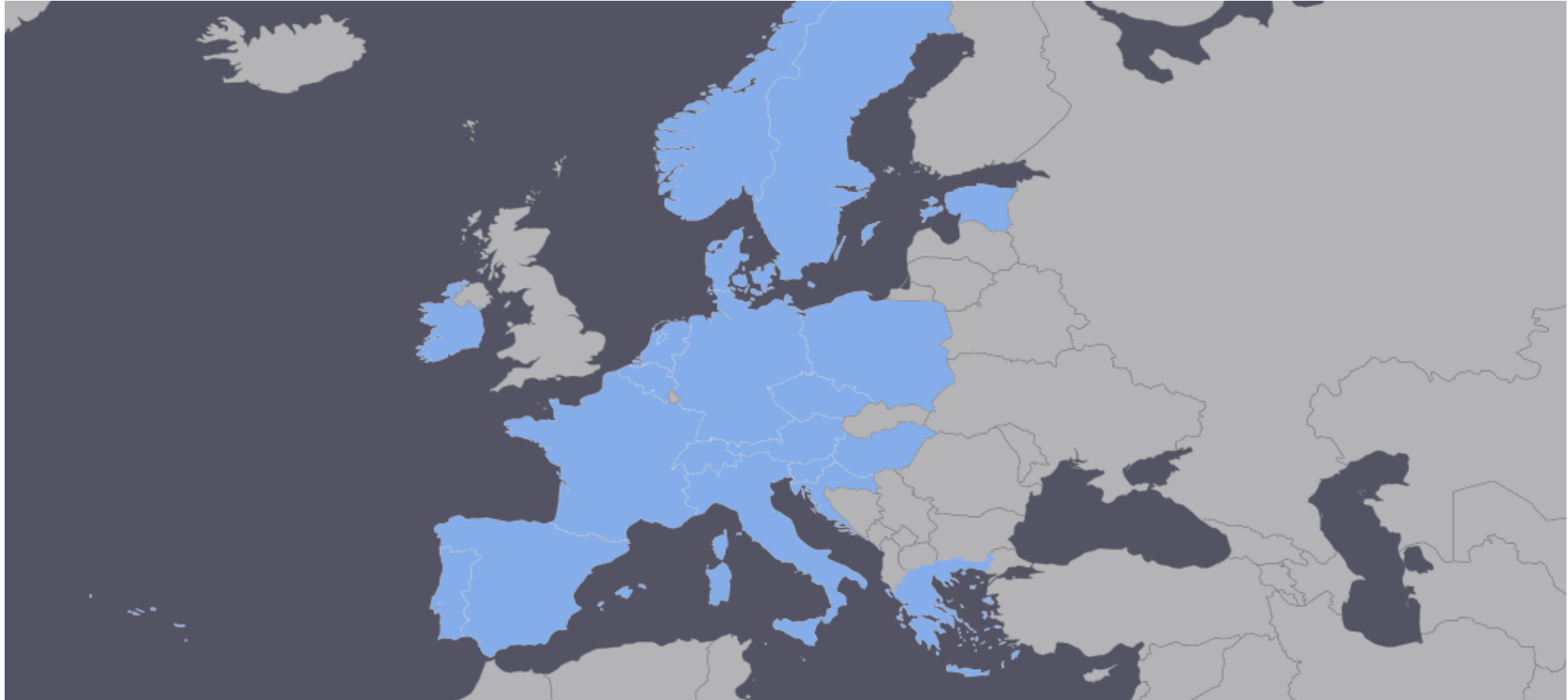


eArchiving Capability Maturity Model (improvement process)



Contact us using the following email address
support@e-ark-foundation.eu

eArchiving Capability Maturity Model (use cases)



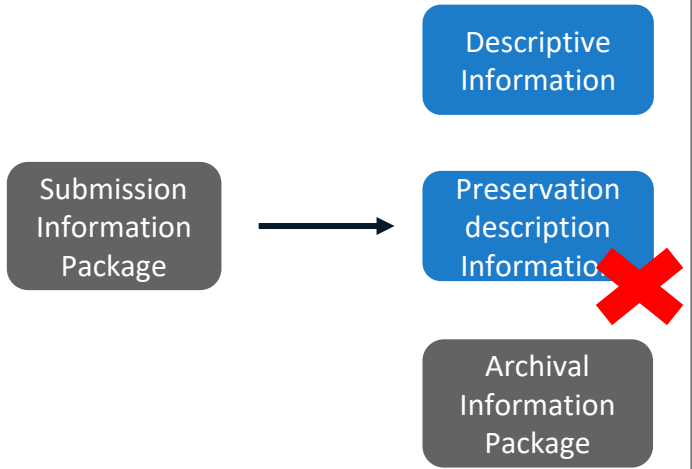
There are several **reported** organisations that have used the capability maturity model

eArchiving Capability Maturity Model (example findings)

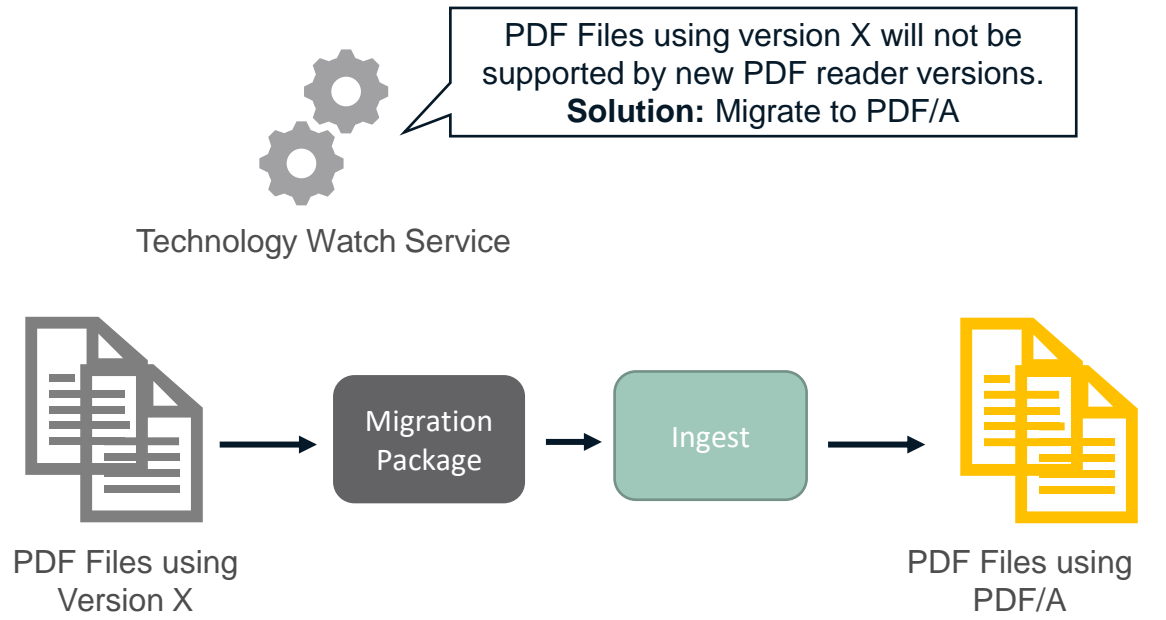
ID	13.7
Title	Preservation Description Information (PDI) acquiring procedures (from a SIP)
Question	Are there procedures for acquiring Preservation Description Information (PDI), from the SIP?
Purpose	The purpose is to identify if the organization has defined procedures to ensure that the PDI is associated with the relevant content information. This will support authenticity of the preserved objects and enable the detection of unauthorized changes.
Notes	Examples of evidence to demonstrate this can be operating procedures, documentation of the Ingest process, and documentation on how the archive acquires and manages Preservation Description Information (PDI).



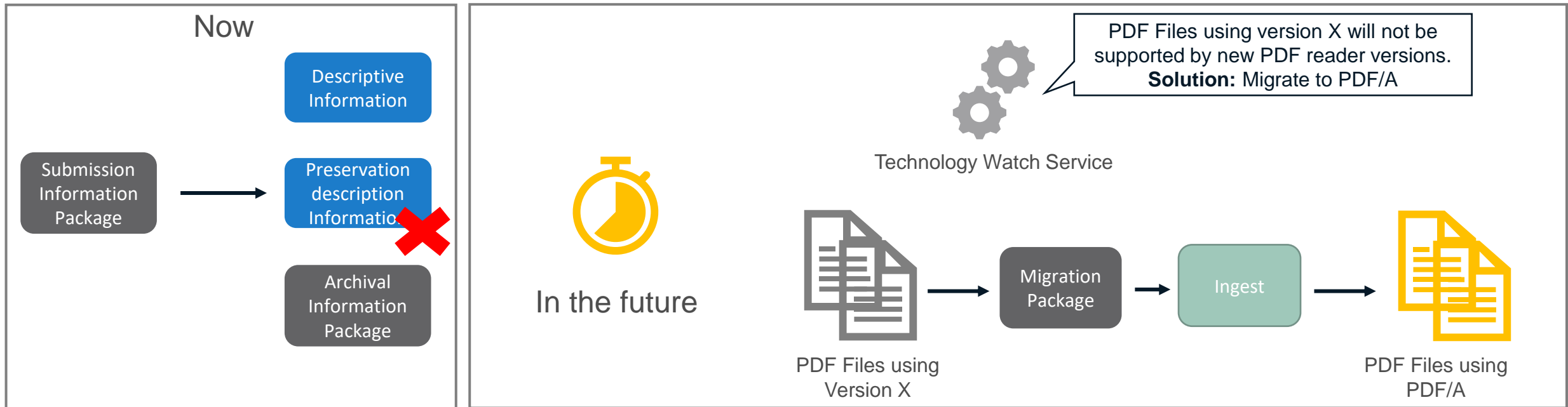
Now



In the future



eArchiving Capability Maturity Model (example findings)

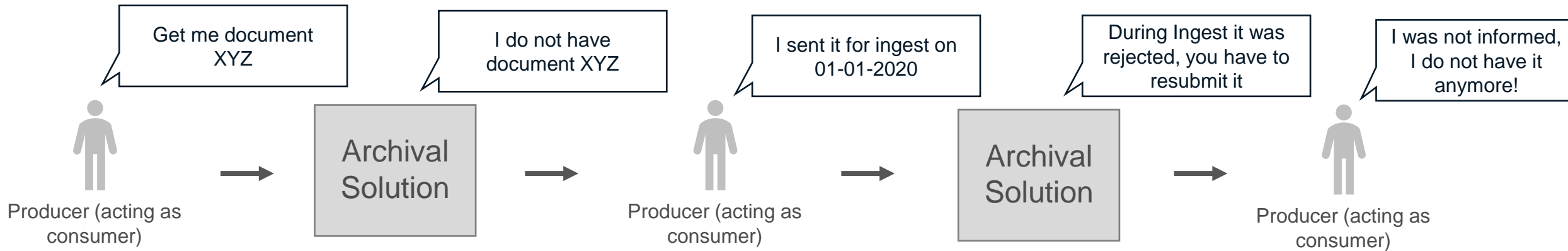


How can we check if the migration was successful?

How can we prove that the migration action did not change the document content?

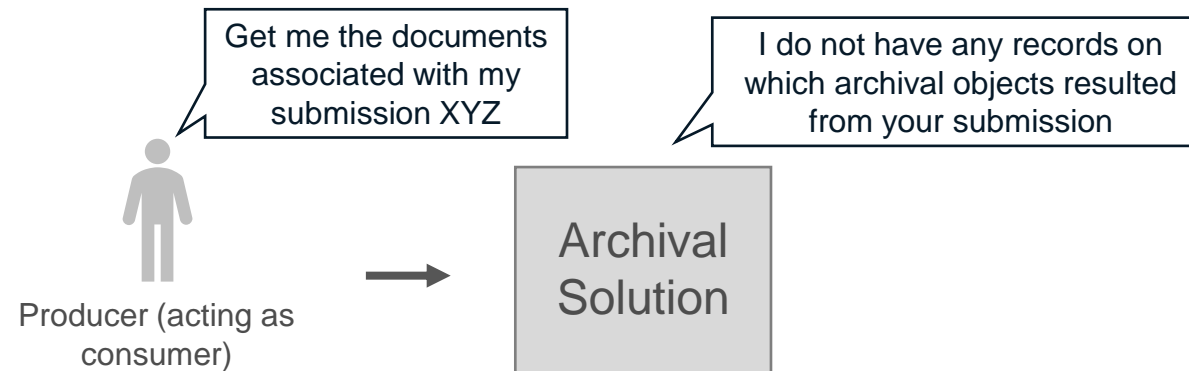
eArchiving Capability Maturity Model (example findings)

ID	I2.1
Title	Ingest Producer/depositor responses
Question	Is there a procedure to provide appropriate responses to the Producer, at the agreed points, during the Ingest process?
Purpose	The purpose is to identify if the organization provides responses to the Producer at the agreed points to ensure that there are no faults in communication that might lead to loss of a SIP.
Notes	Examples of evidence to demonstrate this can be submission or deposit agreements, process documentation, operating procedures, or evidence of responses such as reports, memos, or emails.



eArchiving Capability Maturity Model (example findings)

ID	I3.10
Title	AIP creation records
Question	Does the Ingest process produces records, according to their legal and regulatory environment, to serve as evidence of the actions performed to create an AIP?
Purpose	The purpose is to identify if the organization has records, according to their legal and regulatory environment, to serve as evidence of the actions performed to create an AIP, as to ensure that nothing is omitted from AIP records which might be needed to verify that all AIP have been properly created and in accordance with the documented procedures.
Notes	Examples of evidence to demonstrate this can be documentation of decisions and/or action taken with timestamps; preservation metadata logged, stored, and linked to relevant digital objects.
eArchiving RA Mapping	Views -> 03 Maturity Model views -> 02 Ingest -> Generate Descriptive Information
Terms	-
Answers	No: There are no records, according to their legal and regulatory environment, to serve as evidence of the actions performed to create an AIP. Yes: There are records, according to their legal and regulatory environment, to serve as evidence of the actions performed to create an AIP.
Source	TRAC – Criterion 4.2.10 [6]





Thank you

Contact



<https://e-ark4all.eu/>



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<https://www.linkedin.com/company/eu-e-archiving-initiative>



<https://www.youtube.com/@e-ark>