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International Assessor Certification Scheme™
Data Management SPICE
Version 0.1 – Special VDA SYS 2022 Pre-Release. Ready for piloting.

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How to use this booklet

MGD.1 Data Management and Data Quality Requirements

The purpose of data management and data quality requirements is to elicit, process, derive, and manage evolving stakeholder needs and requirements, throughout the life cycle of the data.

Purpose: What benefit does this process offer?

Data Management and Data Quality Requirements – Process Outcomes

Process outcomes: What are the typical process results?

1. Business/use cases are defined to justify data management activities based on a clear scope of data to be managed and its expected benefit.
2. Stakeholder requirements as well as derived data management and data quality requirements are defined.
3. A continuing interaction with relevant stakeholders is established.
4. ...

[Outcome x]: refers to the data management process outcome no. x

Base practices

Base Practices: What are the practices to achieve the process purpose?

BP 1 **Create business/use case.** Develop and keep up to date a business/use case as basis for a data management and data quality strategy. Ensure alignment of business case/use case with stakeholder requirements. [OUTCOME 1]

Notes and Definition: How to interpret and apply the related base practice

Notes & Definitions:

1 Verify, if an existing business/use case can be reused or needs to be adapted. If reuse is done, verify whether or not current requirements are complete, correct, and comprehensive.

2 .....

Data Management Work Products: What are the typical artefacts?

Data Management Work Products: xxx

Supporting Data Management Principles: xxx

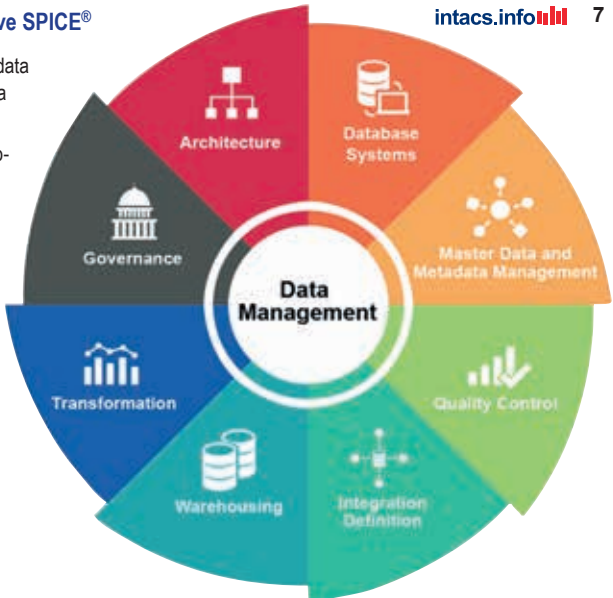
Supporting: How does the base Practice (incl. artefacts) is related to ...

The data management principles

(page 9)

Data Management SPICE the bridge to Automotive SPICE®

- There are increasing risks by the growing complexity of data creation, going from unstructured to structured data, data automatization, lack of processes and much more.
- Verification of processes against appropriate process models also for consistent Data Management and Quality.
- “State of the art” process know how is required, enabling safety, security and legal principles.
- The “Data Management SPICE” model explicitly covers process groups for Data Management, Data Quality, Data Operations (incl. Data Life Cycle, Meta Data Management and more).
- There is a need to align stakeholder expectations and requirements in the context of the data life cycle by using a common vocabulary.
- The bridge shall ...
  - Close and use the gap between requirements for SW and data used within those.
  - Using the same PAM framework for SW and Data



Why Data Management SPICE?

Viewpoint from an organization "managing" data

- Driving acceptance of process capability requirements for data collection, compilation and maintenance, especially in the automotive industry
- Helping for implementing "state of the art" practices for combining process quality with criteria for data quality
- Practices describing "what" is expected (not the how)
  - Avoiding discussions about how to map existing PAMs that match only partly or not at all
  - Usage of a common vocabulary that fit for data management, application and delivery level

Wishful thinking in the long run:
Use of Data Management SPICE
as an add on or plugin to other PAMs.

Viewpoint of an "assessor"

- Very broad interpretations of existing processes and practices in data managing organizations
- Lack of common terminology for data
- How to link existing SW capabilities to required capabilities for data management, by a comparable framework and rating methodology
- Interpretation guidance how to use MAN/SUP in the context of data is likely needed

Viewpoint from an organization "consuming" data

- Providing a bridge between applications developed in a SPICE framework and reliable data used by those, by specific criteria and spelled out expectations related to data quality
- Learning a terminology that combines SW and Data needs

"Data Management SPICE" add on assumptions

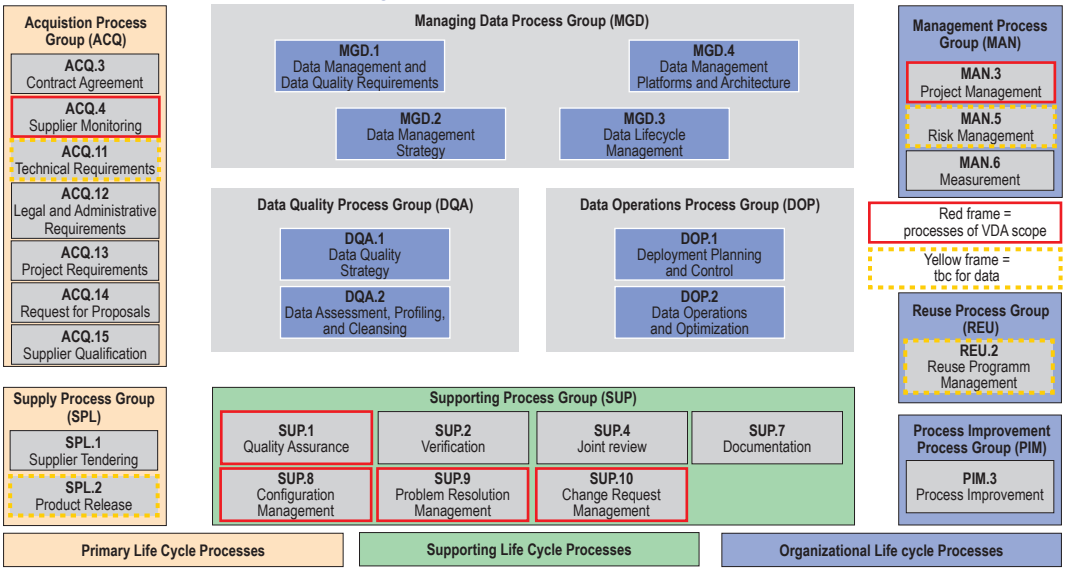
Viewpoint from an organization "managing" data

- Providing practices that consider todays and future business need and collaboration models (e.g., Data as a Service (DaaS), provider = consumer?).
- Could be used independently OR as an addon to existing PAMs (e.g., replacing Engineering V.)
- Retaining existing process attributes / generic practices (capability dimension) on CL2-5.
- Retaining MAN/ACQ/SUP/PIM process groups and processes.

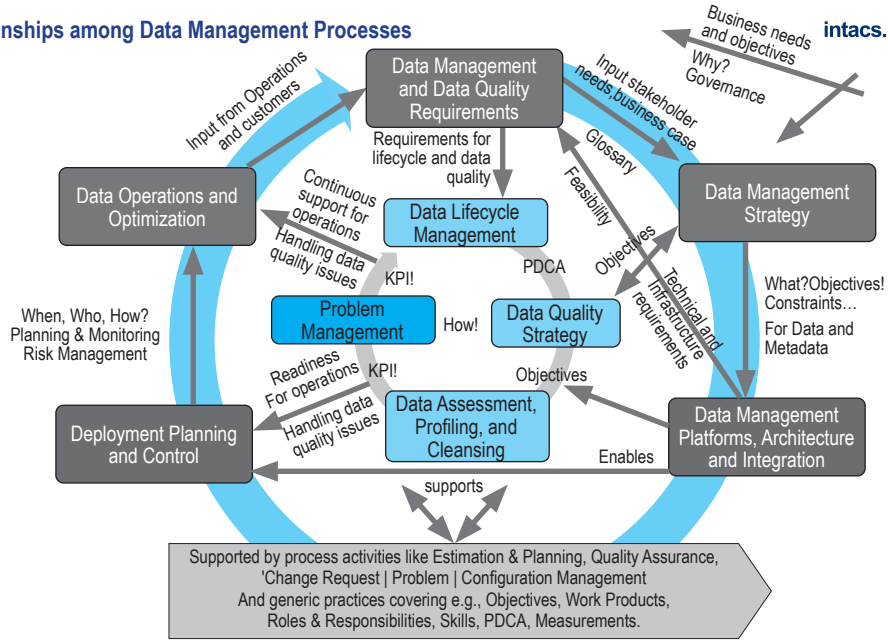
Data Management is the set of all methodological, conceptual, organizational, technical measures and procedures for handling the resource "data", with the aim of introducing them into business processes with their maximum potential for use.

1. **The aim of all activities is to introduce data into a business process, with a maximum potential of beneficial usability.**
2. **Commitment to a "data culture". With strong leadership, strategy and trust in a secure environment and strong and owned privacy standards.**
3. **Therefor Agile and DevOps designs and principles are used, to create accountability for every piece of information owned by a specific business domain.**
4. **The business domain design a strategy and vision, for data required and the business / use case applied.**
5. **Understand the lifecycle of data from acquisition to destruction. This includes quality objectives and criteria to ensure the required quality level.**
6. **Acknowledge that metadata is an important part of all processes and activities. A key component to manage usage, storage and maintenance of the data.**
7. **Ensure proper documentation and tracking of data.**

Automotive SPICE® PAM and Data Management SPICE PAM



Relationships among Data Management Processes



MGD.1 Data Management and Data Quality Requirements – outcomes and work products

The purpose of data management and data quality requirements is to elicit, process, derive, and manage evolving stakeholder needs and requirements, throughout the life cycle of the data.

Process outcomes – as a result of successful implementation of this process

1. Business/use cases are defined to justify data management activities based on a clear scope of data to be managed and its expected benefit.
2. Stakeholder requirements as well as derived data management and data quality requirements are defined.
3. A continuing interaction with relevant stakeholders is established.
4. Criteria for analyzing requirements as well as for integration, verification, and validation are established and used.
5. Connections and consistency between business/use cases, to different levels of requirements, to lifecycle, to architecture and platforms, to verification and validation criteria, to data quality objectives and to operations, are ensured.
6. Changes in the stakeholder's requirements are managed.

Output work products

1.	xx-yy	Business/use case	7.	xx-yy	Data management requirements
2.	17-03	Stakeholder requirements	8.	xx-yy	Data quality requirements
3.	15-01	Analysis report	9.	13-22	Traceability record
4.	13-19	Review record	10.	13-21	Change control record
5.	14-50	Stakeholder groups list			

BP 1 **Create business/use case.** Develop and keep up to date a business/use case as basis for a data management and data quality strategy. Ensure alignment of business case/use case with stakeholder requirements. [OUTCOME 1]

1. *Verify, if an existing business/use case can be reused or needs to be adapted. If reuse is done, verify whether or not current requirements are complete, correct, and comprehensive.*
2. *In the context of data management, a business/use case justifies data management activities based on a clear scope of data to be managed and its expected benefit.“*

BP 2 **Elicit stakeholder requirements.** Elicit stakeholder requirements for data management and data quality based on identification and involvement of relevant parties. Ensure agreement on stakeholder requirements and continuous involvement of stakeholders. [OUTCOME 2]

3. *Ensure that all stakeholders achieve a common understanding of the requirements.*
   - *Record the rationale for the usage of the data and required data quality*
   - *Typically, stakeholder requirements address business, legal, normative, safety and security requirements as well as internal requirements and specific customer requirements.*
4. *The list of stakeholders should be clearly defined based on the business context and on active identification and involvement of relevant parties.*
5. *Create a baseline for agreed requirements (see to SUP.8)*

BP 3 **Specify data management and quality requirements.** Derive and specify requirements for data management and data quality to identify the required functional and non-functional capabilities. [OUTCOME 2]

6 *Requirements should be derived from a specific business/use case.*

7 *Typically, functional requirements help to achieve a specific purpose of data across its lifecycle (see MGD.3.BP1). Nonfunctional requirements typically address requirements for architecture and platforms.*

BP 4 **Analyze requirements.** Analyze the data requirements to ensure correctness, completeness, verifiability, and risk identification. Analyze the impact on business/use case, data lifecycle, and data platforms/architecture. [OUTCOME 3]

8 *As a result, it should be possible to assess existing versus needed capabilities to fulfill the requirements. (see MAN.3 on feasibility, estimation, skills and consistency)*

BP 5 **Develop integration, verification, and validation criteria.** Develop integration, verification, and validation criteria for each data management and data quality requirement as basis for measurable quality of data architecture, platforms, integration, and operation. [OUTCOME 4]

9 *Typically, integration refers to integration of data based on data flows (see MGD.3)*

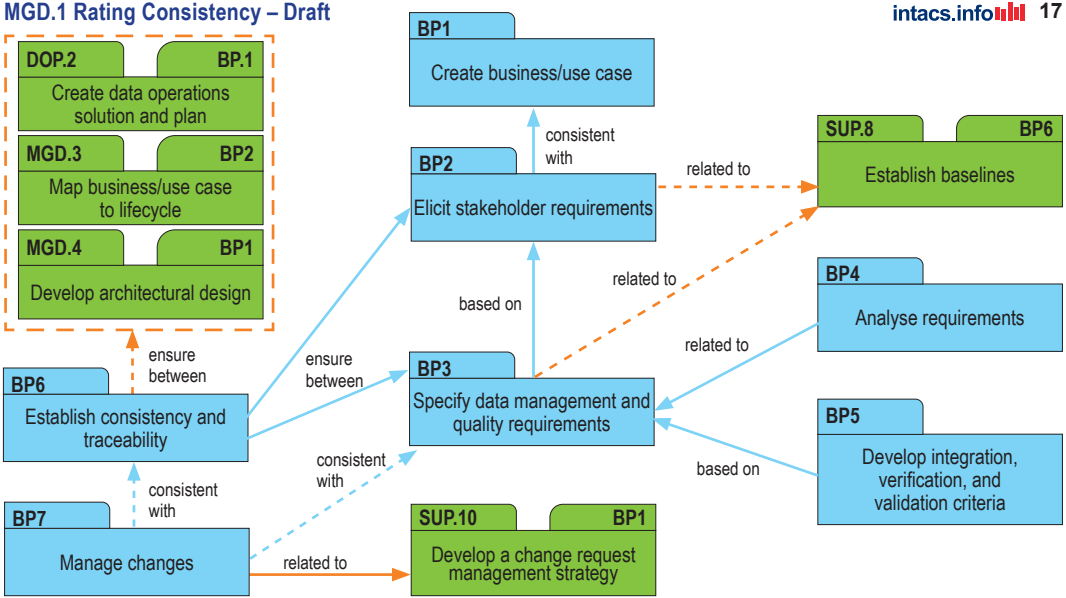
BP 6 **Establish consistency and traceability.** Establish traceable connections or references between business/use cases, different levels of requirements, to lifecycle, to architecture and platforms, to verification and validation criteria, to data quality objectives and to operations, to ensure consistency. [OUTCOME 5]

10 *The criticality and risks of stakeholder requirements (e.g., related to functional safety or cybersecurity) drives the need of the level of detail of connections; e.g., bidirectional traceability to lower levels.*

11 *Typically, different roles are involved in establishing traceable connections.*

BP 7 **Manage changes.** Manage all changes made to stakeholder requirements. Assess impact and risks associated to the change and initiate appropriate actions. [OUTCOME 6]

12 *see to SUP.10*


DOP.2
BP.1
Create data operations solution and plan
MGD.3
BP2
Map business/use case to lifecycle
MGD.4
BP1
Develop architectural design
BP1
Create business/use case
consistent with
BP2
Elicit stakeholder requirements
related to
SUP.8
BP6
Establish baselines
based on
related to
BP4
Analyse requirements
ensure between
ensure between
BP6
Establish consistency and traceability
BP3
Specify data management and quality requirements
related to
BP5
Develop integration, verification, and validation criteria
consistent with
based on
consistent with
BP7
Manage changes
related to
SUP.10
BP1
Develop a change request management strategy

MGD.2 Data Management Strategy – outcomes and work products

The purpose of the data management strategy is to define the basis for managing and monitoring all data management related activities in the context of respective business/use cases and requirements.

Process outcomes – as a result of successful implementation of this process

1. A strategy for managing data and metadata is established.
2. Sources of data are managed throughout the lifecycle of data.
3. A strategy for data retention and archiving established.
4. A business glossary is established and agreed upon.
5. A strategy for data integration, deployment, operation and optimization is established.
6. A strategy for communication ensuring alignment with data management strategy and all related data management activities is established.
7. The status of achieving the objectives of the data and metadata management strategy is reported on a regular basis.

Output work products

1.	xx-yy	Data management strategy
2.	xx-yy	Archiving and retention strategy
3.	xx-yy	Business glossary
4.	13-04	Communication record
5.	15-05	Evaluation Report

BP 1 **Create (meta) data management strategy.** Create and keep up to date a data and metadata management strategy covering content, context, and structure pertaining to data management. [OUTCOME 1]

1. *Data refers to content, whereas metadata provides context of and information about data. Typically, metadata is processed information and used for managing the data life cycle.*

BP 2 **Manage sources of data.** Identify and manage potential sources of data as well as their collection, acquisition, consolidation, and integration. [OUTCOME 2]

2. *Define and use selection criteria designate authoritative data sources.*
3. *Ensure traceable connections from creation through consumption by all sources and kinds of data within scope.*

BP 3 **Create strategy for archiving and retention.** Create and keep up to date a strategy for data archiving and retention. [OUTCOME 3]

4. *Identify and map data flows and data dependencies impacting retention and archiving.*
5. *Align business/use case with archiving and retention activities.*
6. *Typically, this includes the management of the point of demarcation of data (ownership/responsibility); see MGD.3*
7. *Ensure that historical data management, retention, and archiving meet organizational, legal, and regulatory requirements.*
8. *see SUP.8 for baselining (Configuration Management).*

BP 4 **Manage business glossary.** Create and keep up to date a business glossary for all data management related terms. Agree with and communicate to all affected parties. [OUTCOME 4]

9 *Define terms for a particular business purpose including unique name and description.*

10 *Ensure that terms from the glossary are applied consistently for requirements and their implementation.*

BP5 **Create strategy for integration, deployment, operation, and optimization.** Create and keep up to date a data integration, deployment, operation, and optimization strategy. [OUTCOME 5]

11 *Typically, data integration refers to data being collected, stored, processed and transmitted; this includes (quality) criteria for data integration, and rules for consolidation and transformation (e.g. regarding, redundancies, data gaps, …)*

BP 6 **Establish a communication strategy.** Establish a communication strategy and ensure alignment with data management strategy and all related data management activities. [OUTCOME 6]

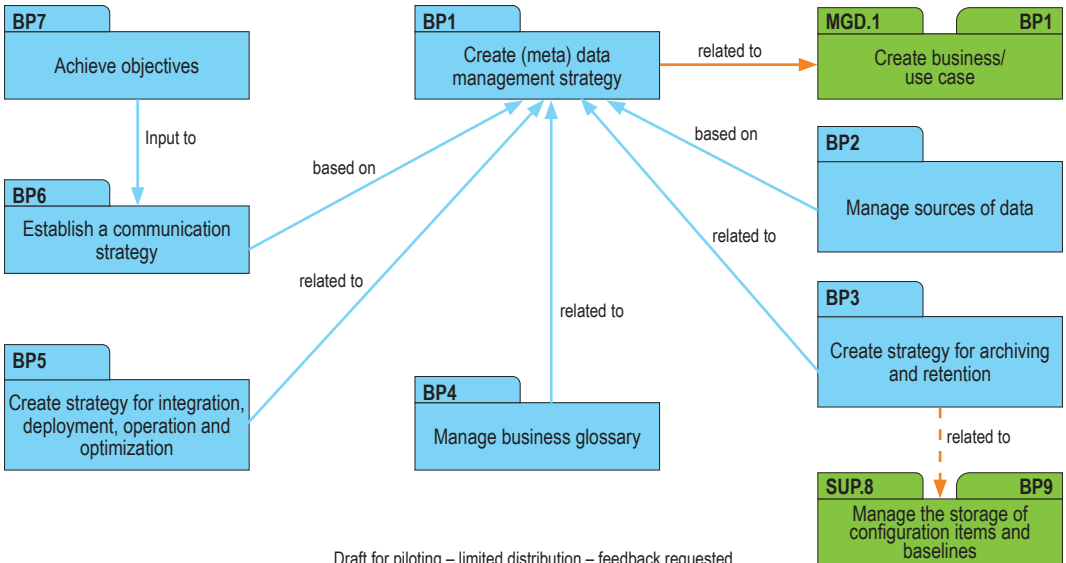
12 *Establish and implement a plan, mechanisms and feedback loops for communication.*

13 *Typically, stakeholders are defined to ensure active identification and involvement of relevant parties for a continued communication and coordination; see MAN.3 (Project Management).*

BP 7 **Achieve Objectives.** Visualize, monitor, adjust, and communicate status of achieving the objectives of the data and metadata management strategy and related strategies. [OUTCOME 7]

14 *Related strategies refer to archiving, retention, integration, deployment, operation and to data quality.*

15 *see MAN.3.*


BP7
Achieve objectives
Input to
BP6
Establish a communication strategy
BP1
Create (meta) data management strategy
related to
MGD.1
BP1
Create business/ use case
based on
BP2
Manage sources of data
based on
related to
related to
related to
BP5
Create strategy for integration, deployment, operation and optimization
BP4
Manage business glossary
BP3
Create strategy for archiving and retention
related to
SUP.8
BP9
Manage the storage of configuration items and baselines

MGD.3 Data Lifecycle Management – outcomes and work products

The process data lifecycle management ensures that the organization understands, maps, inventories, and controls its data flows from creation or acquisition to retirement in line with their related business/use cases.

Process outcomes – as a result of successful implementation of this process

1. A data lifecycle is described and aligned with related business/use cases.
2. Authoritative data sources are identified and selected based on criteria.
3. Data flows and dependencies within and across data are defined.
4. Points of demarcation of data are defined.

Output work products

1.	xx-yy	Data life Cycle
2.	xx-yy	Evaluation Report
3.	xx-yy	Business / use case
4.	xx-yy	Points of demarcation
5.	xx-yy	Data flow

BP 1 **Define data lifecycle.** Create, keep up to date, and use a data lifecycle. [OUTCOME 1]

1. *Data lifecycle phases typically include the following:*
   - *Business Direction (incl. data requirements, data quality requirements)*
   - *Creation (and acquisition)*
   - *Development (architecture and design)*
   - *Implementation (physical architecture)*
   - *Deployment (insertion into the operational environment)*
   - *Operations (data transformations, usage, performance, and maintenance)*
   - *Retirement (decommissioning and archiving)*
2. *Data lifecycle management typically includes an evaluation mechanism in case of changes affecting data.*
3. *The data lifecycle is aligned in accordance with the data management strategy and the data quality strategy.*

BP 2 **Map business/use case to lifecycle.** Evaluate and map business/use cases to the data lifecycle. Record and keep the mappings up to date. [OUTCOME 1]

4. *The specific scope of the data to be managed is defined and aligned with business/use cases.*
5. *In case of existing lifecycle approaches to business/use cases, ensure their alignment with new business/use cases.*
6. *Typically, the mapping addresses the type of data, master data, data sets, metadata.*
7. *Objectives and constraints for target data sets are defined as part of the mapping.*
8. *Typically, data mappings are used to analyse risks, e.g., dependencies.*

BP3 **Designate authoritative data sources.** Create, keep up to date, and use selection criteria to designate authoritative data sources. [OUTCOME 2]

9 *An authoritative data source is considered as the most reliable source for a specific information.*

10 *In the case that two or more sources indicate mismatching data: the data considered the most reliable according to the business/use case needs to be designated as authoritative data source.*

11 *Multiple data sources are evaluated against selection criteria and prioritized in alignment with the data quality strategy*

12 *Selection criteria typically reflect stakeholder requirements like business, quality, legal, normative, safety and security.*

BP 4 **Manage data flows.** Manage data flows and dependencies within and across data. [OUTCOME 3]

13 *Utilize lifecycle approach, data mappings, and data requirements to specify the data flows.*

14 *Data flows typically address dependencies, handling of shared data and data sets, mapping to business/use cases, and data flow models.*

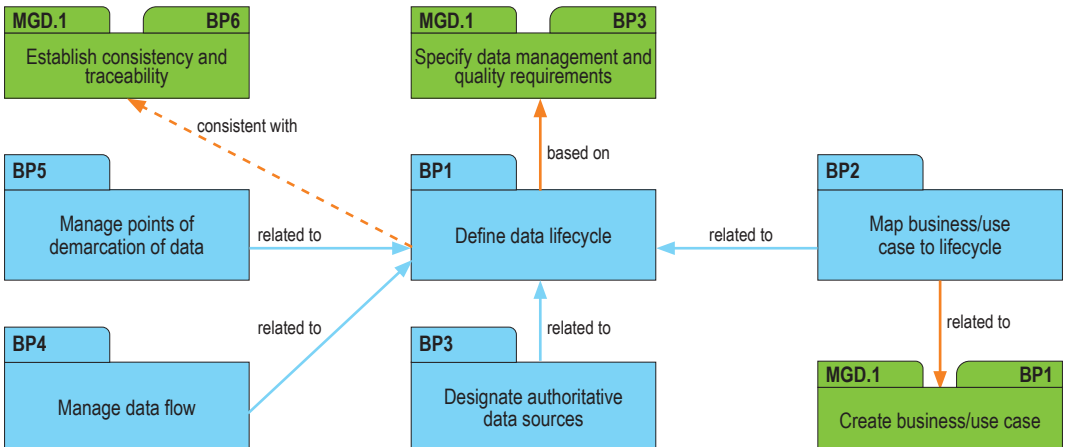
15 *Data flows and their modelling often creates further requirements like latency, transmission capacity, and buffer capacity.*

BP5 **Manage points of demarcation of data.** Identify and manage points of demarcation of data. [OUTCOME 4]

16 *The point of demarcation of data is the instant at which the ownership or responsibility for the data changes.*

17 *Points of demarcation of data and responsibilities are mapped to the data lifecycle or flow.*

18 *In case of shared data or multiple users of the same data, ensure that clear responsibilities and change control mechanisms are agreed on (see SUP.10).*


MGD.1
BP6
Establish consistency and traceability
MGD.1
BP3
Specify data management and quality requirements
consistent with
based on
BP5
Manage points of demarcation of data
related to
BP1
Define data lifecycle
related to
BP2
Map business/use case to lifecycle
related to
related to
related to
BP4
Manage data flow
BP3
Designate authoritative data sources
MGD.1
BP1
Create business/use case

MGD.4 Data Management Platforms and Architecture – outcomes and work products

The purpose of the process Data Management Platforms and Architecture is to create and keep up to date architectural design, platforms, and technical interfaces for managing (meta) data.

Process outcomes – as a result of successful implementation of this process

1. An architectural design to specify the elements and interfaces of the architecture is defined.
2. Data Management platforms are created and maintained.
3. Technical data interfaces based on data management platform and architecture requirements are defined and managed.

Output work products

1.	xx-yy	Architectural design
2.	xx-yy	Interface specification
3.	xx-yy	Data management platforms
4.	xx-yy	Infrastructure specification

BP 1 **Develop architectural design.** Define and keep up to date an architectural design to specify the elements and interfaces of the architecture. [OUTCOME 1]

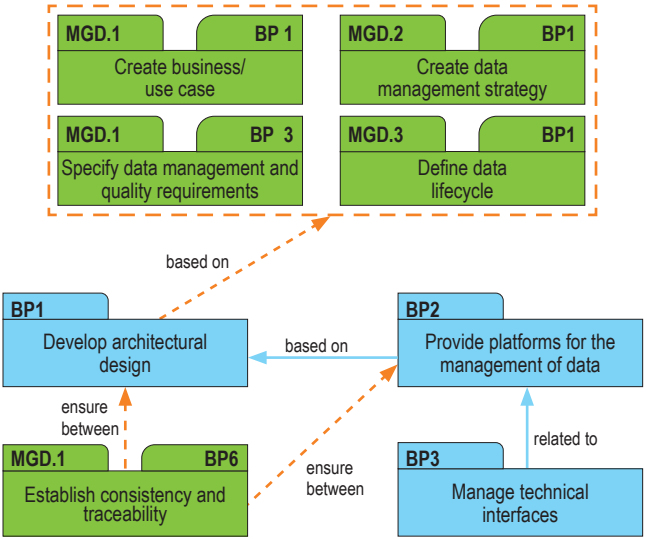
1. *The design of the architecture is driven by architectural approach, standards, and criteria:*
   - *in line with business/use cases, the data management strategy, and the data lifecycle*
   - *using applicable standards and criteria, reflecting technical objectives, legal and regulatory requirements, platform constraints, data access, cybersecurity etc.*
2. *Define evaluation criteria for alternative solutions and record the decision rationale.*

BP 2 **Provide platforms for the management of data.** Create, keep up to date, and use (meta) data management platforms and maintain the corresponding infrastructure. [OUTCOME 2]

3. *A data management platform serves as a system of record and as a trusted source of data. Typically, it is a collection of technologies and applications to manage data across the whole data lifecycle.*

BP 3 **Manage technical interfaces.** Identify, record, and manage all technical data interfaces based on data management platform and architecture requirements. [OUTCOME 3]

4. *Technical interfaces address the whole lifecycle and can both be external (e.g.: data source integration, cloud services, customer deployment) and internal (e.g.: between different subsystems, databases, storages, tools).*
5. *Typically, the description of technical capabilities of interfaces includes: e.g.: data exchange format, exchange protocol, estimated size and frequency of data exchange, tolerance limits, and criteria for their verification and validation.*


MGD.1
BP 1
Create business/ use case
MGD.2
BP1
Create data management strategy
MGD.1
BP 3
Specify data management and quality requirements
MGD.3
BP1
Define data lifecycle
based on
BP1
Develop architectural design
based on
BP2
Provide platforms for the management of data
ensure between
related to
MGD.1
BP6
Establish consistency and traceability
ensure between
BP3
Manage technical interfaces

DQA.1 Data Quality Strategy – outcomes and work products

The purpose of the data quality strategy is to define and derive objectives and related criteria to ensure the required data quality.

Process outcomes – as a result of successful implementation of this process

1. A strategy for managing data and metadata is established including data quality objectives and criteria.
2. Criteria and objectives are consistent and aligned with stakeholders.
3. The status of achieving data quality objectives and criteria is monitored and communicated.

Output work products

1.	xx-yy	Data quality strategy
2.	xx-yy	Criteria for success (data quality criteria? Fit for purpose criteria?)
3.	13-09	Review record
4.	13-04	Communication record
5.	xx-yy	Data status report

DQA.1 Data Quality Strategy – Practice Summary

BP 1 **Create data quality strategy.** Create and keep up to date a data quality strategy in line with the data management strategy, data quality requirements, and data lifecycle. [OUTCOME 1]

1. *Typically, a data quality strategy contains*
   - *Derived quality objectives; potentially competing/contradicting objectives should be addressed*
   - *Alignment with business/use case and the criticality/risk of data in scope*
   - *Alignment with existing data management policies and governance mechanisms*
   - *Described scope in terms of covered data types (e.g., raw data, processed data, data sets, meta data, application data) and lifecycle phases*
   - *Approach how to ensure consistency among criteria and objectives*
   - *Recorded criteria for data quality (see BP2)*
2. *Typically, the way data quality is addressed differs depending on the phase in a data lifecycle.*
3. *Baselining, archiving, and managing changes is handled by SUP.8*

BP 2 **Define criteria for success.** Define and refine criteria for the required data quality objectives to achieve business/use cases and data quality requirements. [OUTCOME 1]

4. *Typically, data quality criteria depend on domain of data and related business/use case: e.g., accuracy, completeness, consistency, credibility, correctness, accessibility, compliance, confidentiality, efficiency, precision, traceability, understandability, availability, portability, recoverability [see ISO/IEC 25012]*
5. *The criteria are used to verify that the data is fit for purpose.*
6. *Typically, criteria contain expected and measurable state, range or thresholds.*

BP 3 **Align with stakeholders.** Ensure consistency, alignment, and coordination of criteria and objectives among stakeholders. [OUTCOME 2]

7 *Ensure aligned view of criteria for data quality across the lifecycle.*

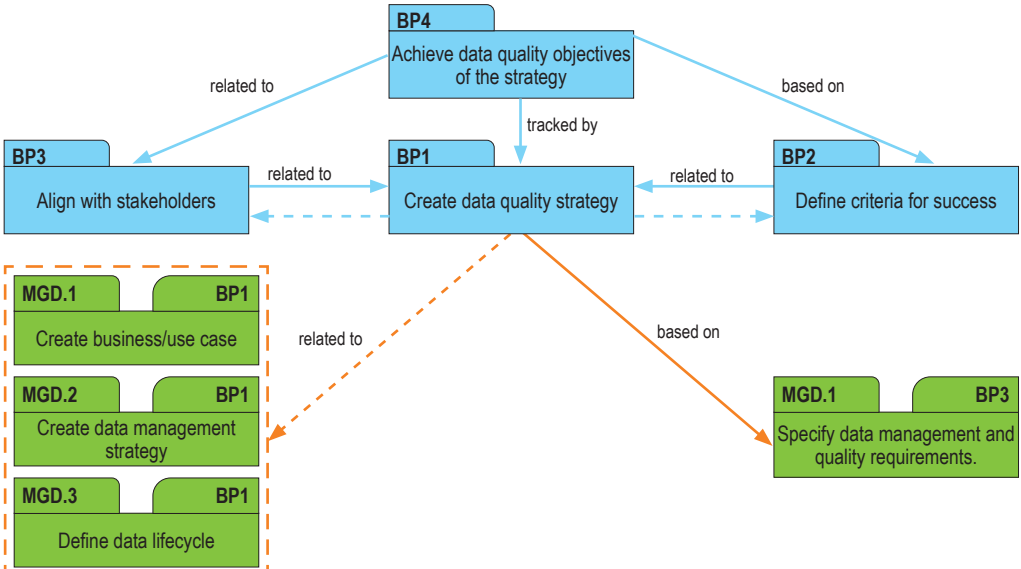
8 *Consistency here is related to the criteria themselves and their interpretation by different stakeholders.*

BP 4 **Achieve data quality objectives of the strategy.** Visualize, monitor, and communicate status of achieving the objectives of the data quality strategy. [OUTCOME 3]

9 *All defined criteria should be tracked.*

10 *The type of monitoring (continuous or event driven) and frequency of reporting depends on the respective criteria.*

11 *Deviations typically trigger problem management (see SUP.9) or further data assessment, profiling, or cleansing activities (see DQA.2).*



DQA.2 Data Assessment, Profiling and Cleansing – outcomes and work products

The purpose of data assessments, profiling, and cleansing is to provide a systematic approach to evaluate data quality and understand contents of sets of data, as well as to validate and provide correct data according to defined quality criteria and objectives.

Process outcomes – as a result of successful implementation of this process

1. An approach and plan for data quality activities is established.
2. Data assessments, profiling, and cleansing activities are performed as planned.
3. Results from data quality activities are monitored.
4. Results from data quality activities are used to ensure and improve data consistency and validity.

Output work products

1.	08-13	Quality plan
2.	xx-yy	Data quality strategy
3.	xx-yy	Data Quality Results (Assessment report - > Data status report)
4.	13-07	Problem record (data specific)

DQA.2 Data Assessment, Profiling, and Cleansing – Practice Summary

BP 1 **Create data quality approach and plan.** Create and keep up to date an approach and plan for data assessment, profiling, and cleansing based on defined objectives and criteria. [OUTCOME 1]

1. *Typically, the approach includes selection criteria for which data is to be looked at via assessment, profiling, or cleansing ("What") as well as the specific objectives, criteria, and rules; the approach includes relationships between assessment/ profiling and cleansing activities/objectives; the approach could be part of the data quality strategy ("Why") (see DQA.1).*
2. *Typically, the plan schedules, visualizes dependencies, manages scope and resources for activities including used methods and tools ("How").*

BP2 **Perform data assessment.** Perform data assessments to identify data problems based on defined objectives, criteria, and rules. [OUTCOME 2]

3. *Typically, results are used to plan for specific data profiling and cleansing activities.*
4. *An assessment can be used as initial evaluation of data to derive objectives/criteria for further analyses (e.g., unknown use / business cases for data, unclear content of data).* [OUTCOME 2]

BP 3 **Perform data profiling.** Perform data profiling on selected set of data based on defined objectives, criteria, and rules to examine this data set and assess the impact of using it. [OUTCOME 2]

5. *Data profiling helps in gaining an understanding of criteria like the structure, relationships, content, quality, and rules of a specified set of data under management; typically, profiling looks at the risks of data joins and data integration steps and derives a measure of confidence or trust in data*

BP4 **Perform data cleansing.** Perform data cleansing to identify problems based on objectives, criteria, and rules

6 *Data cleansing intents to ensure consistency and validity for use of data; it also can be used to detect data problems; typically, cleansing encompasses enrichment actions and focusses on detecting data inconsistencies according to predefined rules.*

7 *Data cleansing can include (business) rules ensuring data quality while entering data.*

8 *Data cleansing typically addresses corrupt, inaccurate, incomplete, irrelevant, parts of data (sets).*

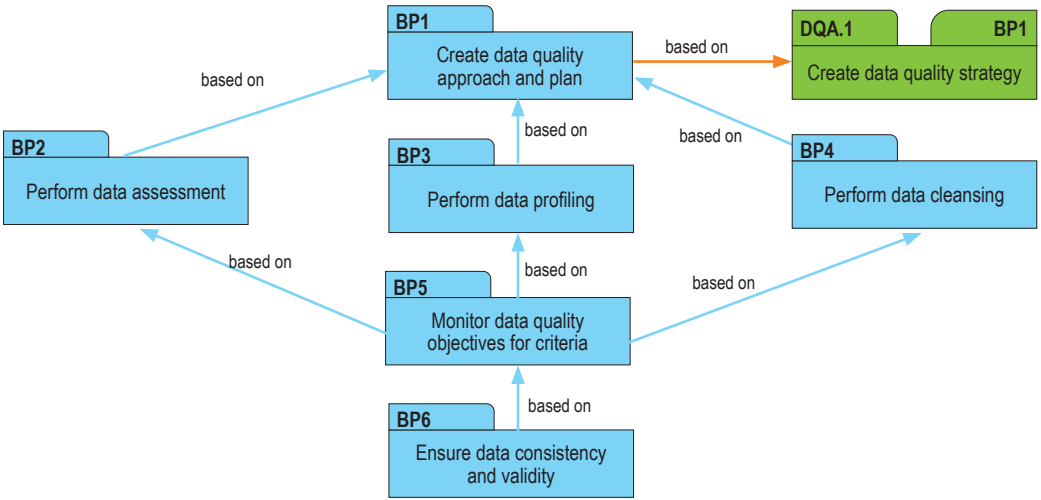
BP5 **Monitor data quality objectives for criteria.** Evaluate, visualize, and monitor results from data assessment, profiling, and cleansing activities. [OUTCOME 3]

BP6 **Ensure data consistency and validity.** Act on results, resolve problems, and adjust data to ensure data consistency and validity. [OUTCOME 4]

9 *Acting can incompass e.g., correct, improve, update, reject, archive, delete, transform, integrate, enrich, cleanse, and can include normalization of data.*

10 *Could trigger both improvement of individual data but also improvements to methods, tools, and processes as well as competencies both internally and for suppliers (see SUP.9/10 and ACQ.4 and DOP.2).*

11 *Results from data quality activities typically trigger a root cause analysis of underlying problems (see SUP.9).*



DOP.1 Deployment Planning and Control – outcomes and work products

The purpose of the Deployment Planning and Control process is to transition the integrated, verified, and validated data to operational environment following a data deployment plan. The impacts to the operational environment are managed.

Process outcomes – as a result of successful implementation of this process

1. The data deployment plan is developed based on the data management and data quality strategy.
2. Requirements are analyzed and the impact on the deployment is determined.
3. Data is integrated, verified, and validated and the results are documented and communicated.
4. The prepared data is deployed and the impact on the operational environment is managed.

Output work products

1.	xx-yy	Data deployment plan
2.	xx-yy	Point(s) of demarcation
3.	11-04	Product release package
4.	14-06	Schedule
5.	xx-yy	Operational environment

BP 1 **Develop data deployment plan.** Develop and keep up to date a data deployment plan aligned with the data management and data quality strategy. [OUTCOME 1]

1. *The deployment plan addresses all aspects of planning, communicating, managing, and confirming that data effectively makes the transition to the operational environment. It typically includes:*
   - *deployment/release planning and release notes*
   - *planned integration, verification and validation steps in line with specified criteria (see MGD.1.BP5 and MGD.2 BP5)*
   - *acceptance/quality criteria for releases or deployment steps*
   - *readiness criteria for the operational environment*
   - *baselining of deployment platforms (see MGD.4 and SUP8)*
   - *planning for resources and stakeholder involvement*
2. *Define point(s) of demarcation including the level(s) of trust across all deployment and integration steps according to the defined data architecture. (see also MGD.2)*

BP2 **Analyze impact on deployment planning.** Analyse and determine the impact of data management requirements and the data management strategy on deployment planning. [OUTCOME 2]

3. *The data requirements include non-functional requirements like information and cybersecurity, safety, privacy, etc. (see MGD.1)*
4. *Typically, results of this analysis are identified and managed risks (MAN.5) as well as acceptance criteria for each deployment step.*

BP 3 **Perform data integration, verification, and validation.** . Integrate, verify, and validate data as specified in the data deployment plan to ensure consistency across deployment. Results are documented and communicated. [OUTCOME 3]

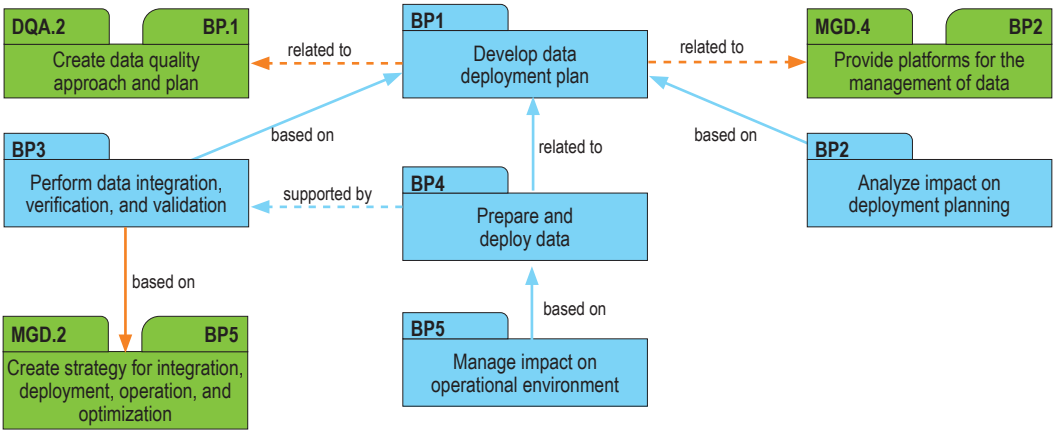
5. *Typically data integration includes both the sequence and the criteria for starting and finishing an integration step.*
6. *Coverage considerations and methods for verification and validation are derived from business/use cases and/or requirements (see MGD.1 and MGD.2) and shall include quality criteria (see DQA.1)*
7. *Typically, data quality is supported via data assessment, data profiling, and data cleansing activities (see DQA.2)*
8. *Typically, additional key figures and criteria for readiness of the operating system and other resources needed for operations are considered.*

BP4 **Prepare and deploy data.** Prepare platforms and stakeholders for the deployment and deploy data based on the data deployment plan. [OUTCOME 4]

9. *Data transfer from sources to destinations typically requires complex rules, data transformations, and data standardization. Typically, specialized tools designed to support physical capture and movement of data are used.*
10. *Typically, both operational environment and relevant stakeholders have to be prepared and informed about changes.*

BP 5 **Manage impact on operational environment.** Manage impact of deployed data on the operational environment. [OUTCOME 5]

11. *Typically, data gathering methods are used to obtain input from relevant stakeholders about the deployment impact. Consider a post deployment review.*
12. *Typically, information about deployment impacts is communicated pro-actively.*
13. *Operational environment might be part of a larger service system (see DOP.2)*


DQA.2
BP.1
Create data quality approach and plan
related to
BP1
Develop data deployment plan
related to
MGD.4
BP2
Provide platforms for the management of data
based on
related to
based on
BP3
Perform data integration, verification, and validation
supported by
BP4
Prepare and deploy data
BP2
Analyze impact on deployment planning
based on
based on
MGD.2
BP5
Create strategy for integration, deployment, operation, and optimization
BP5
Manage impact on operational environment

DOP.2 Data Operations and Optimization – outcomes and work products

The purpose of the Data Operations and Optimization process is to ensure a continuous, stable, safe, secure, and optimized usage of data in operations. The usage characteristics are derived from the intended business/use case and are based on the data operations plan and on the data operations solution.

Process outcomes – as a result of successful implementation of this process

1. An data operations plan and solution is developed in line with the data management and data quality strategy, and based on data management architecture and platforms.
2. Stable, safe, and secure operation is ensured based on the data operations plan and solution.
3. Data is continuously evaluated and optimized.
4. Operation activities are visualized, monitored, and adjusted according to the defined data operations plan and solution.
5. Consistency of intended business/use case with operations and actual application of data is ensured.

Output work products

1.	xx-yy	Data operations plan
2.	xx-yy	Data operations solution
3.	xx-yy	Data status report
4.	xx-yy	Review record

BP 1 **Create data operations solution and plan.** Create and keep up to date a data operations plan and solution in line with the data management strategy and data quality strategy, and based on data management architecture and platforms. [OUTCOME 1]

1. *The solution and the plan shall be based on: business/use cases and lifecycle, schedule, management of the operational environment i.e. data management platforms, the planned for handling of integrity and storage of the data, and needed skills for operations. Typically, a handbook or manual is created.*
2. *Ensure traceable connections of the operations solution to the data management requirements and data lifecycle as well as to data management platforms. For details on Data Management Platforms and Architecture, see MGD.4.*

BP2 **Ensure operations.** Ensure stable, safe, and secure operation and application of the data operations plan and solution. [OUTCOME 2]

3. *Typically, plausibility is ensured in / before moment of use and as basis for decision making.*
4. *Typically, stability includes continuity and availability of data.*
5. *Adhere to and maintain point(s) of demarcation of data (ownership/responsibility), see DOP.1 and MGD.2.*
6. *The availability or access of data in operations might be limited due to criteria like privacy, time, legal, local differences. Typically, criteria can be derived out of SLA's (Services Level Agreements) or DIA/SIA (Development, Supplier Interface Agreements).*

BP3 **Optimize data.** Continuously evaluate and optimize data during operations. [OUTCOME 3]

7 *Use results from continuous data assessment, profiling, and cleansing to optimize data during runtime. (see DQA.2)*

8 *Typically, this results in deletion, correction or enrichment of data e.g., the deletion of data in the operational environment due to expired usage/licenses.*

BP4 **Monitor operations.** Visualize, monitor, and adjust activities according to the defined data operations plan and solution. [OUTCOME 4]

9 *see DQA.1 und DQA.2 for objectives and criteria to be monitored.*

10 *The generated and continuously assessed and evaluated data is input or trigger for a new or changed use/business cases*

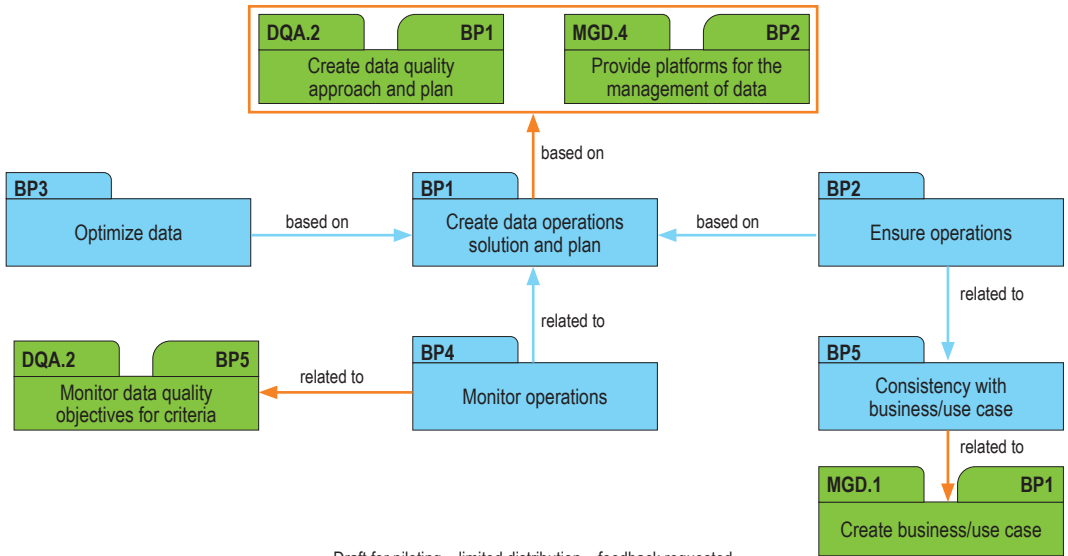
BP5 **Consistency with business/use case.** Ensure consistency of intended business/use case with operation and actual application of data. [OUTCOME 5]

11 *Continuously identify incidents/problems and ensure their resolution (see SUP.10 or SUP.9)*

12 *Typically, business/use cases are validated regularly in the operational environment.*

13 *Typically validation leads to new or changed business/use cases, data management requirements or data lifecycle or changes in architecture, platforms, and interfaces. (see SUP.10)*

14 *Criteria might be the validity of data only for certain business/use cases*



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References

[1] Automotive SPICE® Process Assessment / Reference Model 3.1
http://www.automotivespice.com/fileadmin/software-download/AutomotiveSPICE_PAM_31.pdf

About intacs™

intacs™ is an independent and legally registered noon-profit organization. Intacs works almost exclusively with volunteers and is open, transparent, global and multilingual. The goal is to ensure high quality assessor intacs™ was founded to improve assessments, to reduce variations in the quality of assessment results and to improve their comparability.

In order to reach these goals, intacs™:

- sets training and certification standards for ISO/IEC 15504 and 33002 assessors
- sets standards for maintaining assessor competence
- promotes assessment models and community interactions

intacs™ is accepted by the automotive industry and the VDA AK 13
(working group responsible for defining process requirements for car manufacturers and suppliers).

Benefits

For individuals interested in becoming an assessor:

- You can be sure that you are trained by an accredited training provider with approved up-to-date training material reflecting the latest technical community knowledge.
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