
AVEVAWORLD

AVEVAWORLD

THURSDAY, APRIL 10

Novo Nordisk & Deep Digital:
The Crucial Role of Nomenclature & Taxonomy

SESS-48
Ferdia Kehoe – Novo Nordisk
Sarah O'Neill – Deep Digital Solutions Group
Rory Sheehan – Deep Digital Solutions Group

AVEVA

© 2025 AVEVA Group Limited or its subsidiaries. All rights reserved.

Nomenclature and Standardisation

Asset Framework

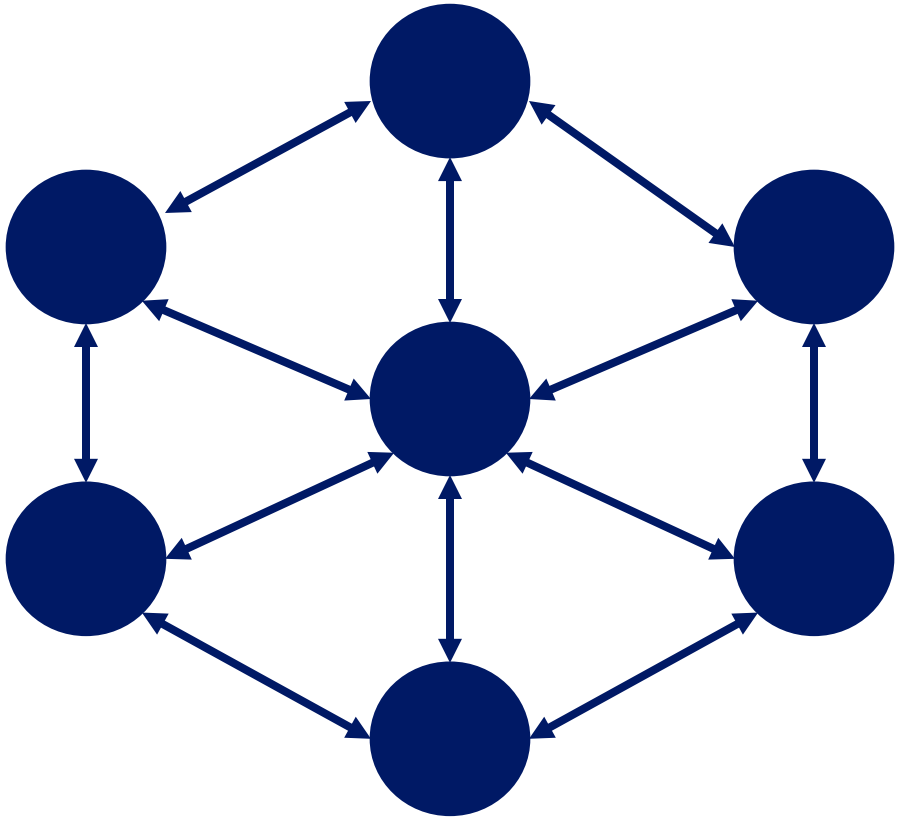
Sarah O'Neill / Ferdia Kehoe

April 2025

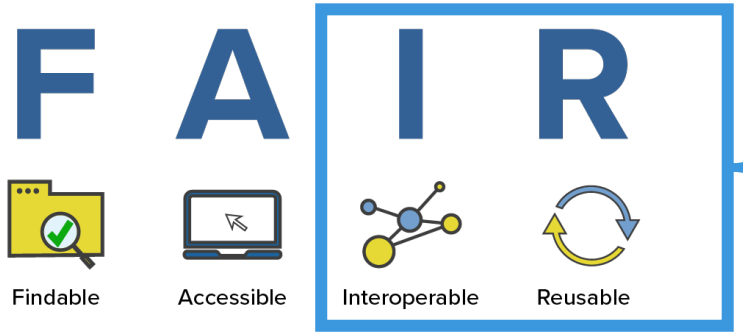
DEEP DIGITAL SOLUTIONS GROUP

novo nordisk®

Our Organisation



Data Foundation Goals



System Standardisation

- Create common definitions to enable analysis across MES, PI and LIMS data
- Remove ETL lag and have as close to realtime data as possible.

Organisational Standardisation

- Support the transition of knowledge across organisational units. (Tech Transfer)
- Reutilise knowledge when creating new production facilities

External Communication Standardisation

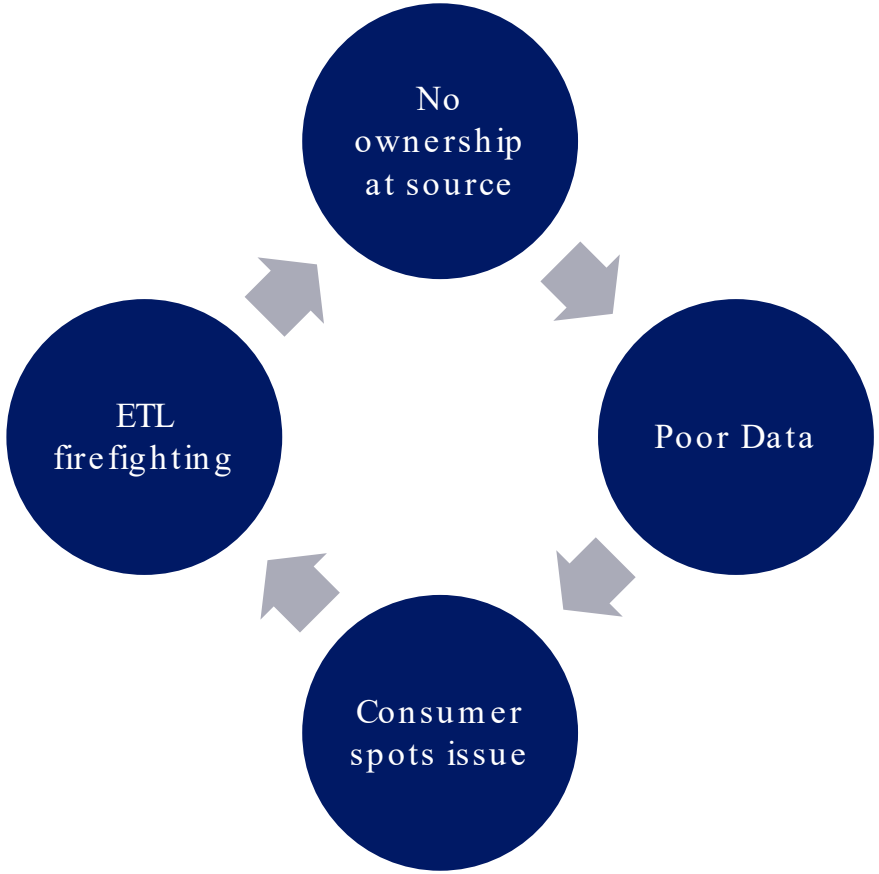
- Bringing acquired companies and partners more easily into the Novo Nordisk information landscape
- Providing a basis to communicate with external partners.

Building a data foundation

Our challenge as an organisation is establishing a robust and reliable infrastructure to support data management, storage, and processing within an organization.

A key issue with this is the data quality loop.

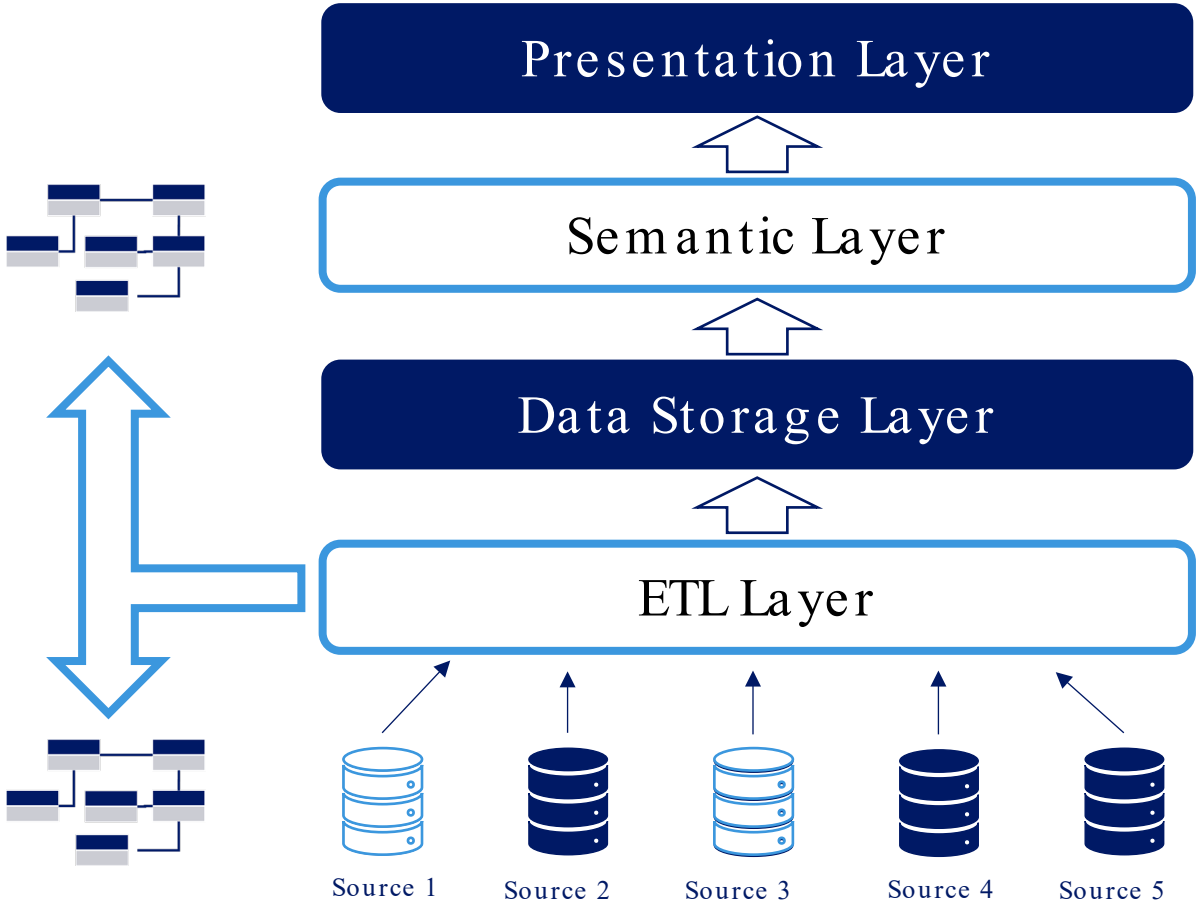
The further you push data quality questions away from source, the further you get from the expertise to fix it.



Building a data foundation

Implementation Focus

Our focus is implementing models, so they drive data quality at the source reducing the need for ETL and ensuring a better fit with a Semantic Layer.

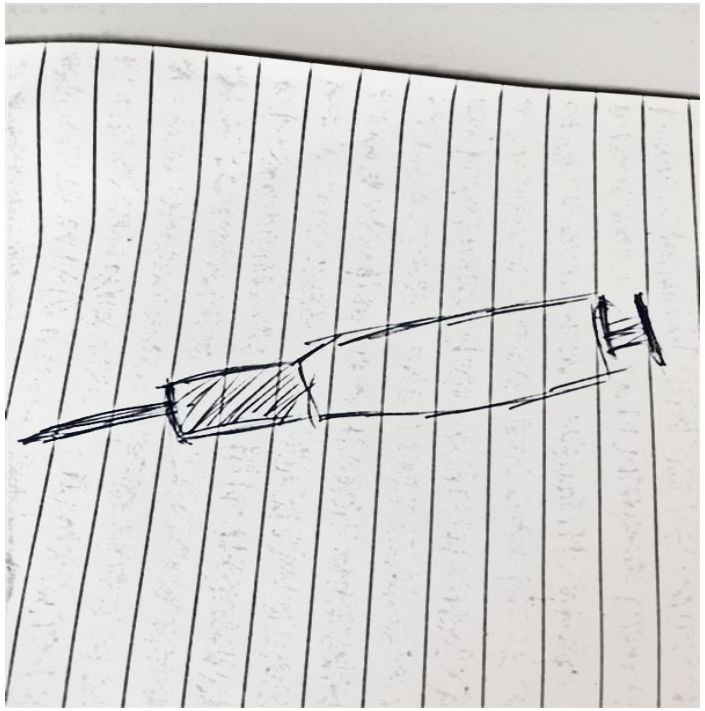


What do we need to create quality data

When building data products, our level of detail is often lacking.

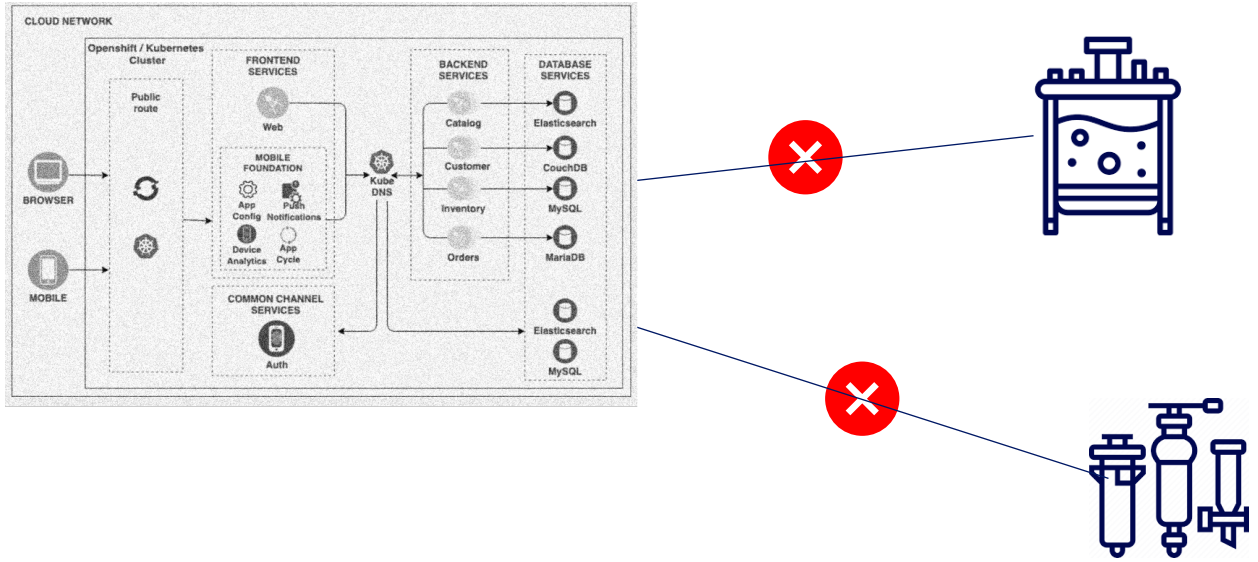
Our perspective of business need basis is a sketch to be interpreted by system engineers.

Spending more time defining the key attributes of an object makes for a far better product.

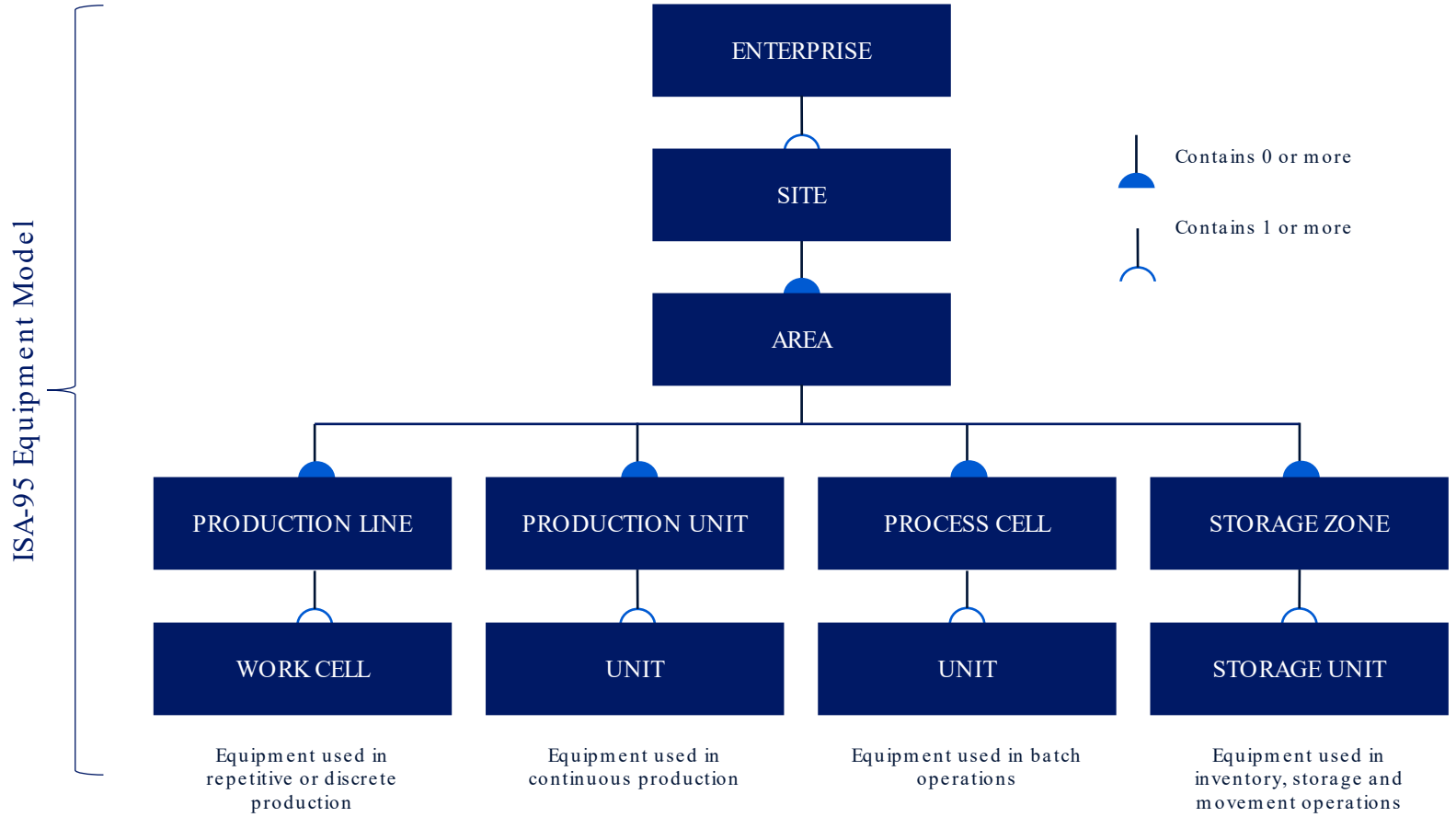


What do we need to create quality data

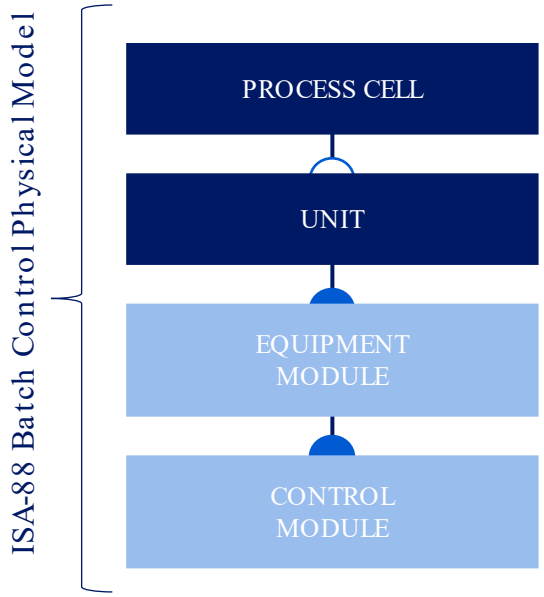
Much good work is undone by OEMs not being specified to communicate in a format that meets the need of the systems utilizing their data.



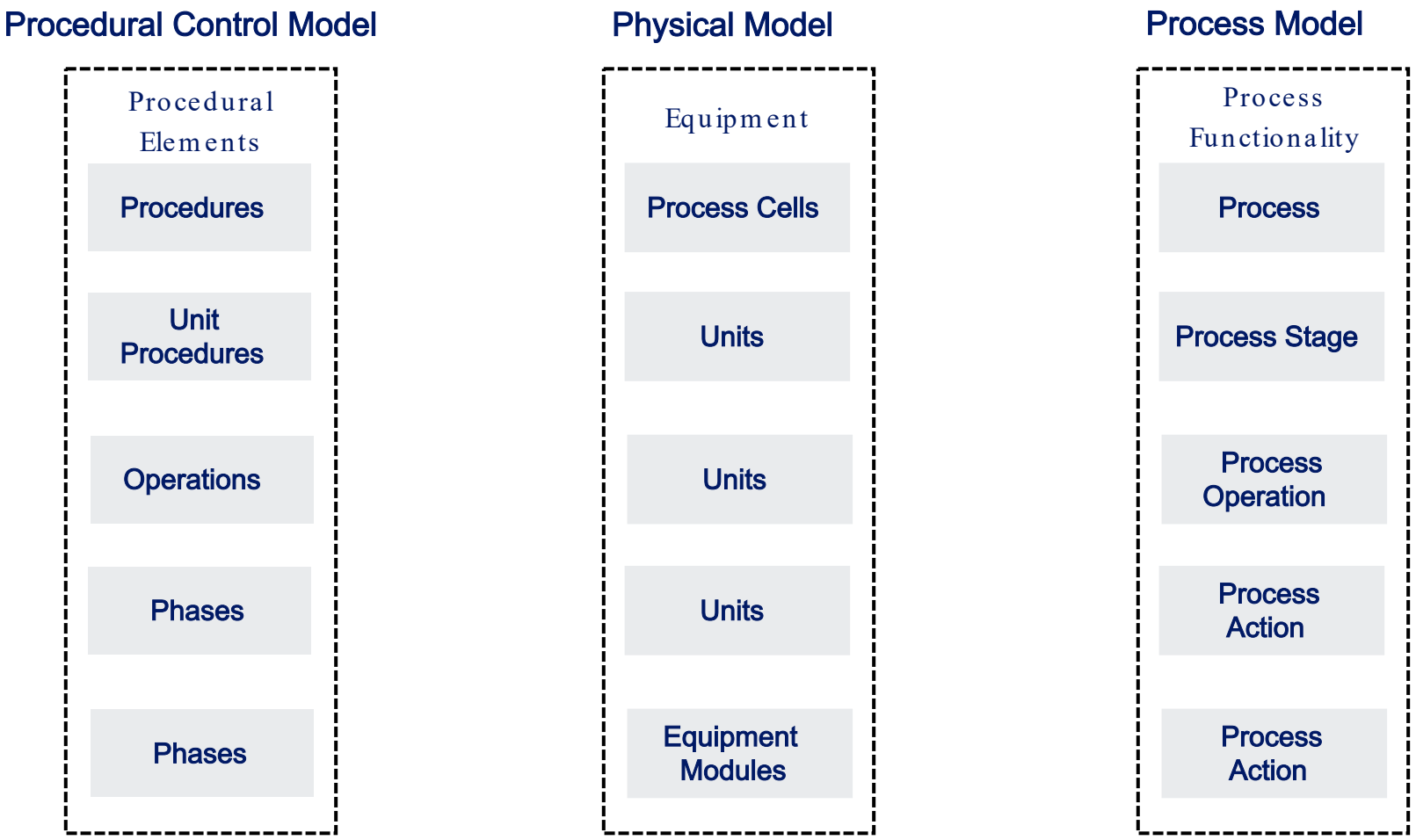
Standardisation: ISA-95 and ISA-88



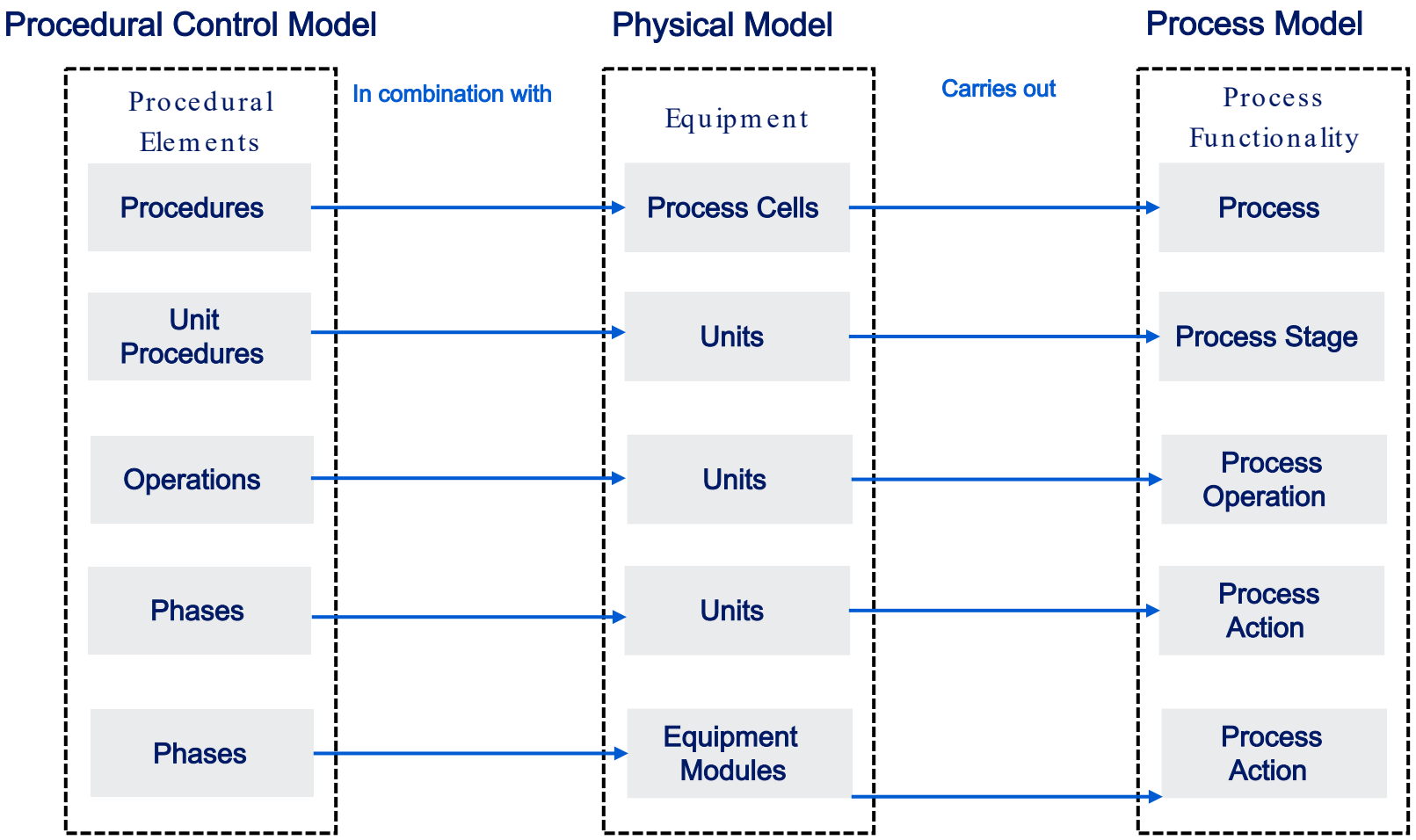
International Society of Automation
Setting the Standard for Automation™



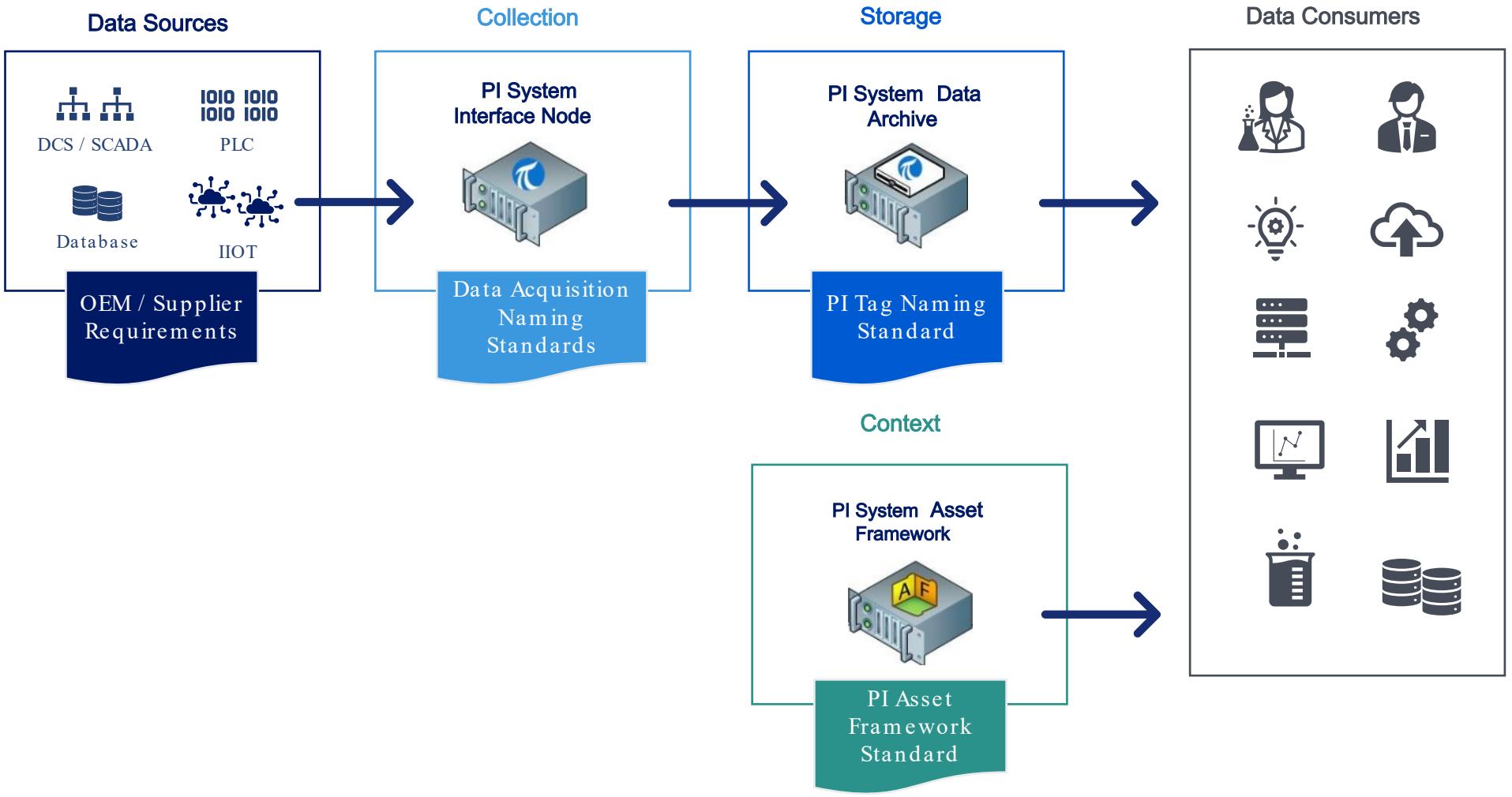
ISA-88 Model Relationship Diagram



ISA-88 Model Relationship Diagram



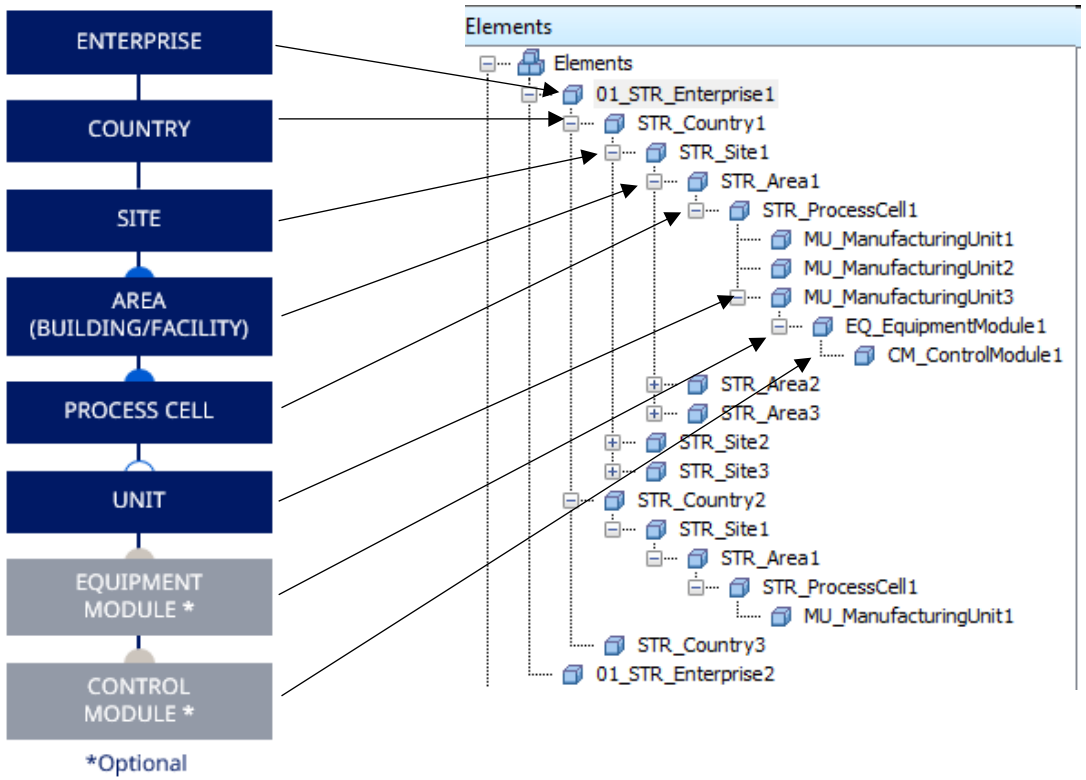
Global PI System Standards

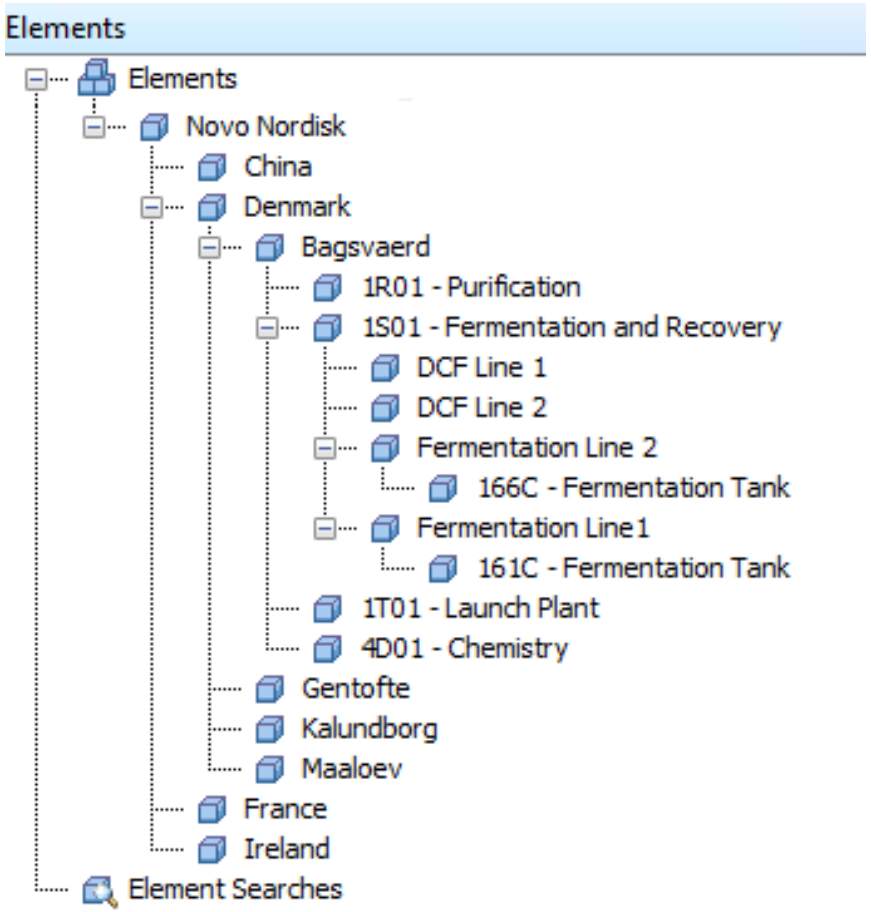


Global PI Tag Naming Standard

Tag Example: DK_BA_1S_161_C__TT001_PV_GXP											
Level 1	Country	DK									
Level 2	Site		BA								
Level 3	Area/Building			1S							
Level 4	Process Cell				161						
Level 5	Unit					C					
Level 6	Equipment Module (Category)										
Level 7	Control Module (Object/Device)							TT001			
Level 8	Tag (Attribute)								PV		
Level 9	GxP Classification									GXP	

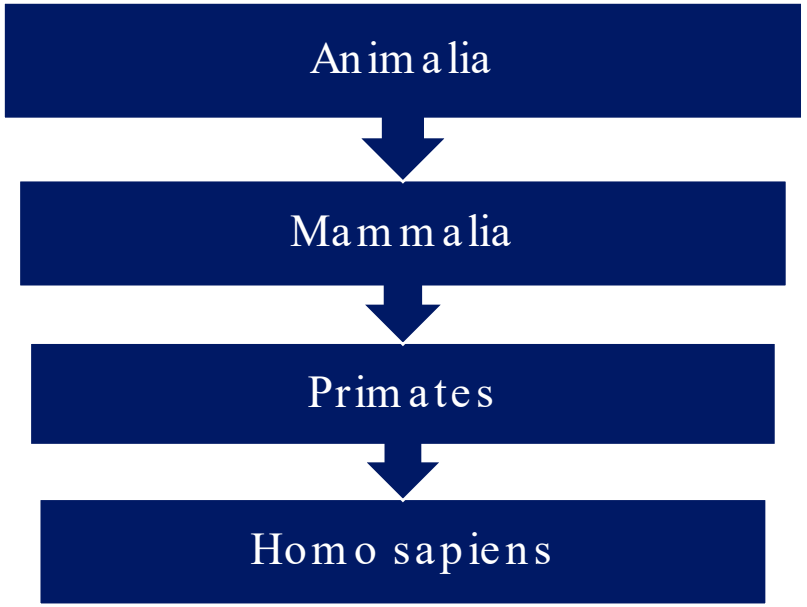
Global PI Asset Framework Hierarchy



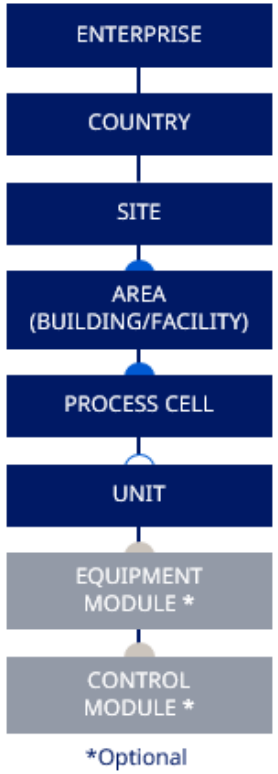


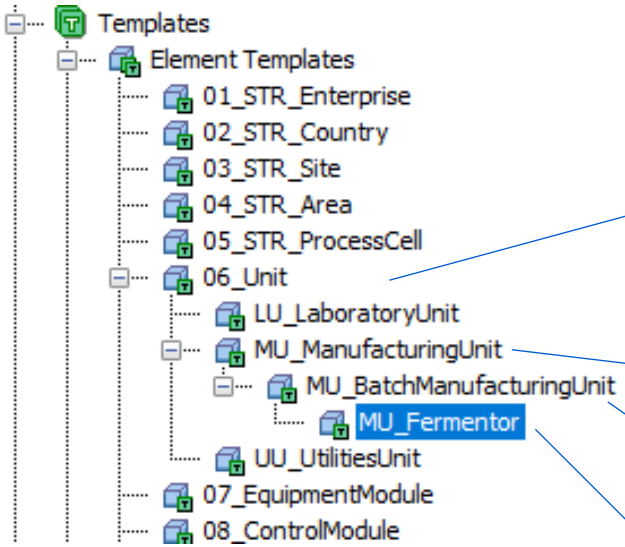
Taxonomy

- Prescribes structure and terminology.
- Applies rigor in specification, ensuring any newly discovered object must fit into one and only one classification or object.
- Inherits all the properties of the class above it but can also have additional properties



Global PI System Asset Framework





MU_Fermentor

General | Attribute Templates | Ports | Analysis Templates | Notification Rule Templates

Filter

Name	Description
Template: 06_Unit	
Area	Area in which unit is located
Country	Country Name
Element Name	Element Name
Element Path	Path to asset in AF
Manufacturer	Manufacturer of Unit
Model	Model of Unit
P&ID	Engineering Blueprint ID
PAS-X ID	PAS-X Unit ID
Process Cell	Area / Building / Facility
SAP ID	SAP Unit ID
Site	Site
Site Code	2 Letter site code
Unit Name	Local naming of unit
Template: MU_ManufacturingUnit	
BatchID	Batch ID
Product	Product Name
Recipe	Recipe Name
Template: MU_BatchManufacturingUnit	
Operation	Manufacturing process operation
Phase	Manufacturing process action
Procedure	Manufacturing process
UnitProcedure	Manufacturing Unit Procedure
Template: MU_Fermentor	
Ammonia-PVState	Ammonia Process Value State
Ammonia-Step	Ammonia Step
B01-Speed-Output	B01 Speed Control Output
B01-Speed-PV	B01 Speed Control Process Value

ISA-88 Procedural Control

PI EVENT FRAME TEMPLATES

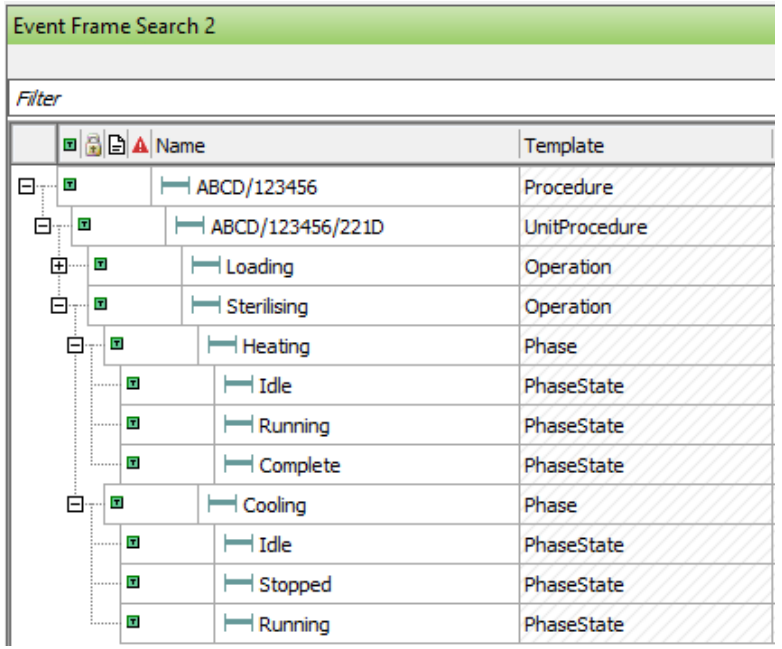
Procedural Control Model

PI Event Frames

Template	Derived Templates	ISA-88 alignment	Derived Template Name
PIBatch	Procedure	Procedures	Procedure.ProductXYZ
PIUnitBatch	UnitProcedure	Unit Procedures	UnitProcedure.TabletCoater_KA_HB
PISubBatch	Operation, Phase, PhaseState, Phase Step	Operations & Phases	Operation.TabletCoaterLoading_KA_HB

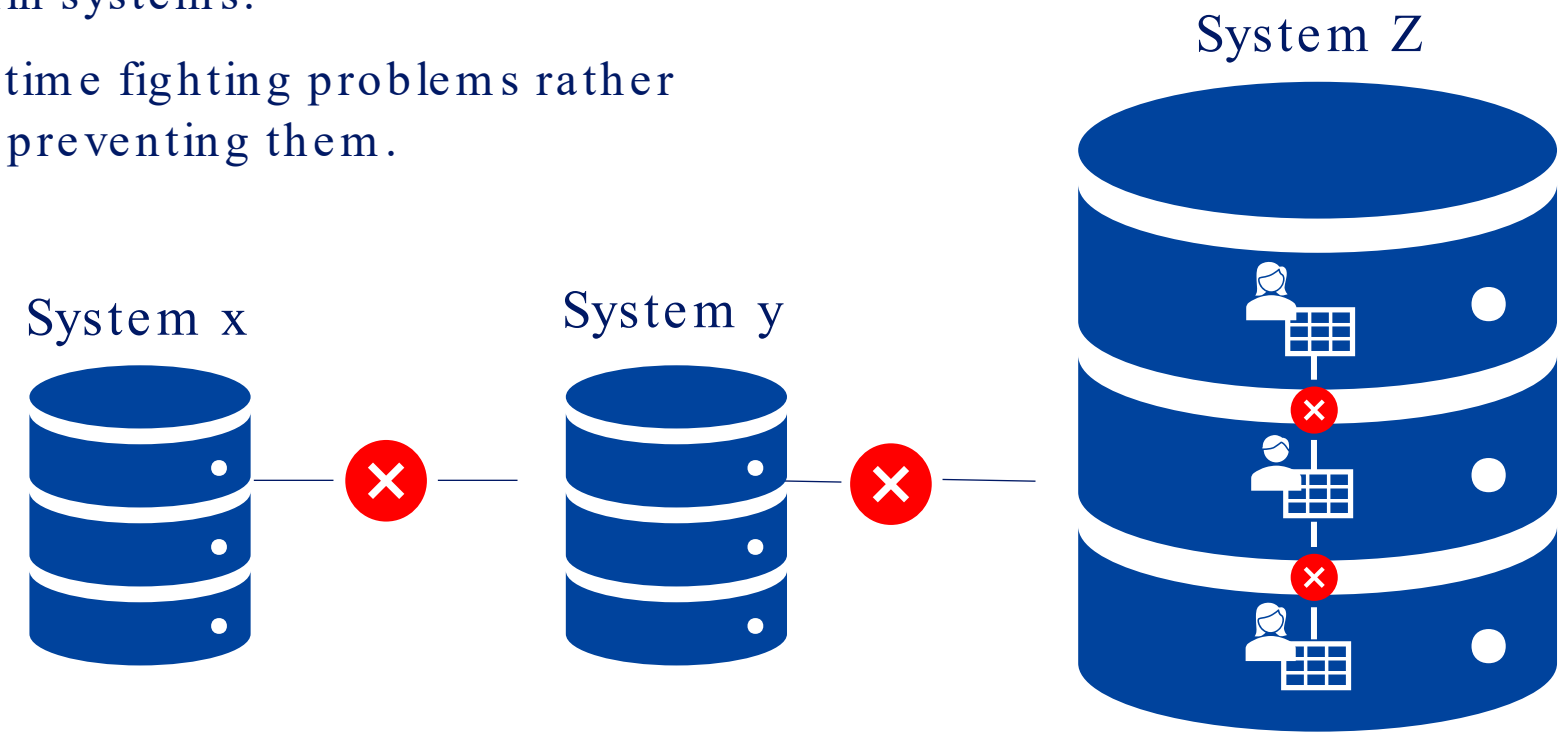
PI Event Frames – Attribution & Naming

Template	Attributes
Procedure	Manufacturing Order ID Product (Material Code) Recipe (Material Name) Batch ID / Lot ID Start Time End Time
UnitProcedure	Batch (e.g. ID / number) Recipe Name / ID Product (Material Code) Start Time End Time CPP/KPP/CQA (values or aggregated values)
Operation, Phase, Phase Step, PhaseState	Start Time End Time CPP/KPP/CQA (values or aggregated values)

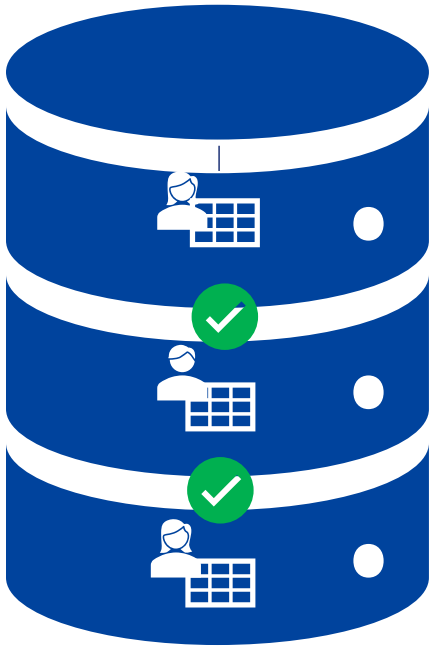


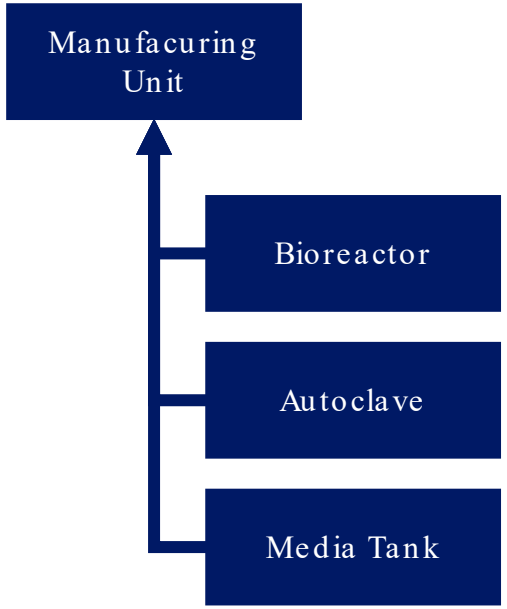
Standardisation across & within systems

- Standardisation can help connect systems but it can also drive quality within systems.
- Users spend to much time fighting problems rather than being experts in preventing them.



Breaking down Silos within Silos





BioReactor Class

Static Attributes
- SAP ID
- PID Reference
- Description
- Location
- Coordinates
- Size

S88
- Batch ID
- Product ID
- Procedure ID
- Batch Active
- Operation Name
- Operation Active
- Phase Name
- Phase Active

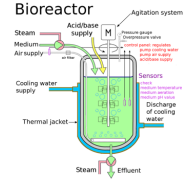
CPP
- Agitation Speed
- Density
- Inlet Flow
- Internal Temperature
- Jacket Temperature
- Level
- Material
- Outlet Flow
- CO2
- Pressure
- pH
- Volume
- Weight

AE & Audit
- Alarm Message
- Event Message
- Audit Message

IN Material
- LOT ID
- Material ID
- Material Name
- Totalizer (Quantity)

OUT Material
- LOT ID
- Material ID
- Material Name
- Totalizer (Quantity)

Bioreactor



A bioreactor refers to any manufactured device or system that **supports a biologically active environment**. In one case, a bioreactor is a vessel in which a chemical process is carried out which involves organisms or biochemically active substances derived from such organisms. This process can either be aerobic or anaerobic. These bioreactors are commonly cylindrical, ranging in size from litres to cubic metres, and are often made of stainless steel

DEEP DIGITAL SOLUTIONS GROUP

novo nordisk®

Standardised data informs across domains and systems


novo nordisk®
DEEP DIGITAL
SOLUTIONS GROUP