

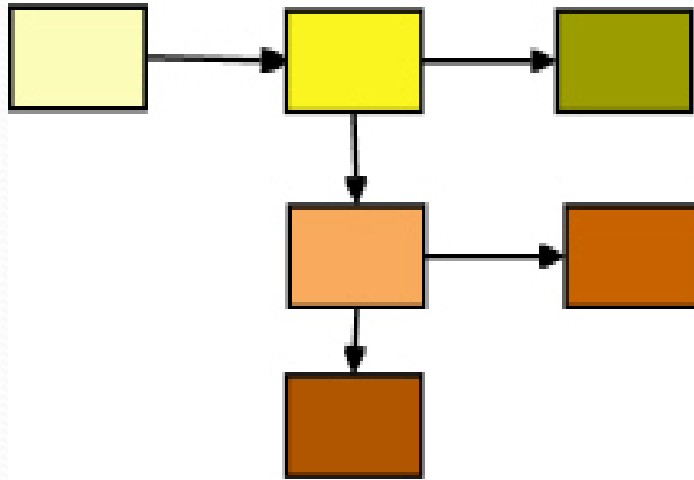


# Standard representation of information

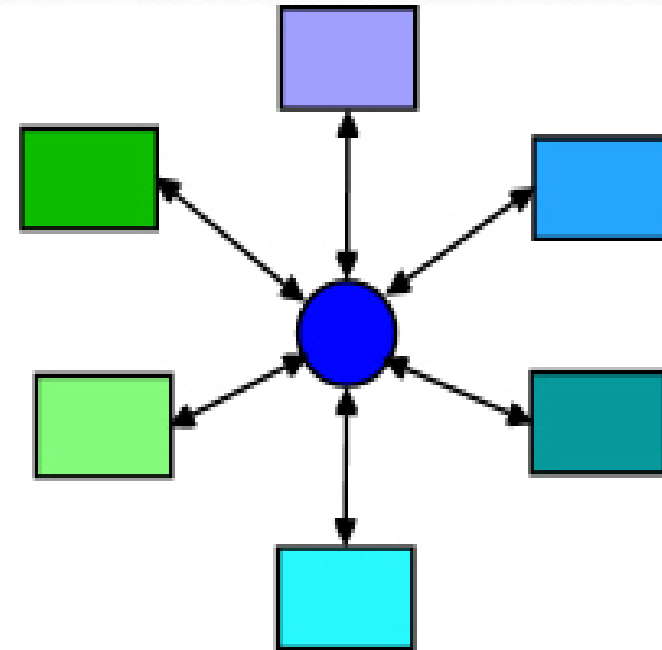
From multiple data streams

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Ferroday Limited

# Systems of systems

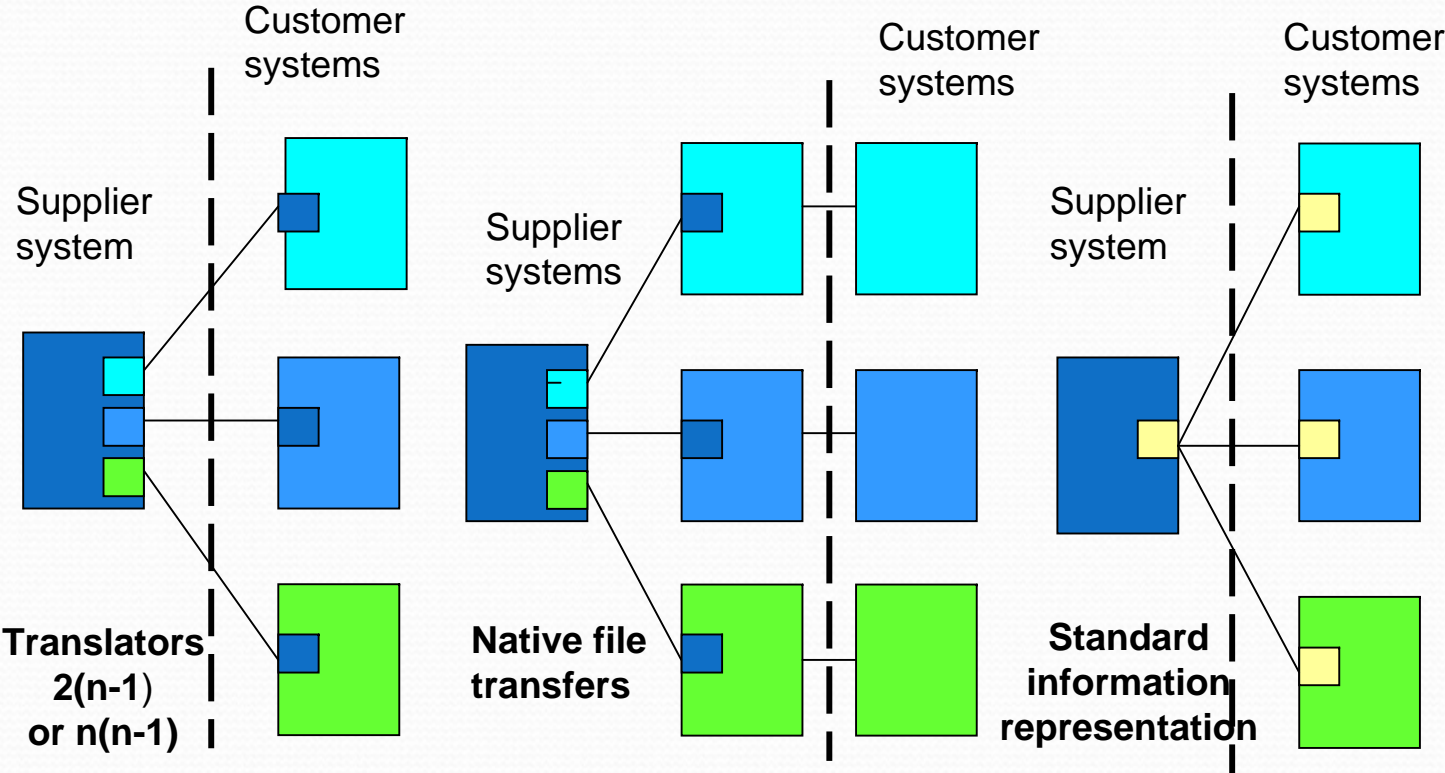


Supply chain  
Manufacturing sequence



Central storage and control  
PDM/PLM system

# Integration of engineering systems





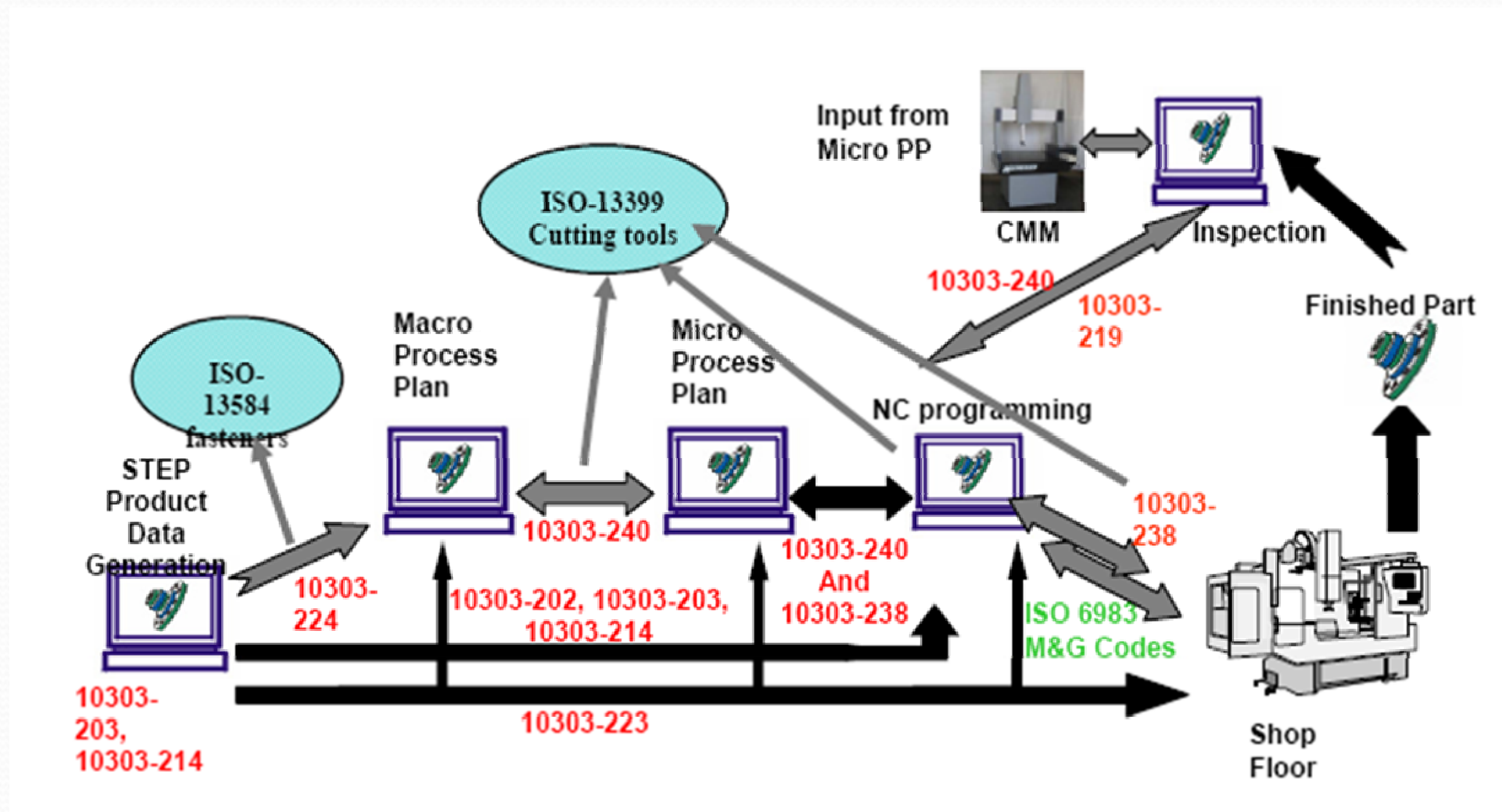
# Communication of information

- To *communicate* information we always need:
  - the data items that encode the information
  - an information model to define the meaning and the structure of the data (semantics and the syntax)
  - a dictionary to define the meanings of the data items
- *Everyone* in a communication process must use the same model and the same dictionary to avoid ambiguity
  - E.g. a sentence in a natural language or the representation of a calendar date are examples of standardised information models

# Product data technology

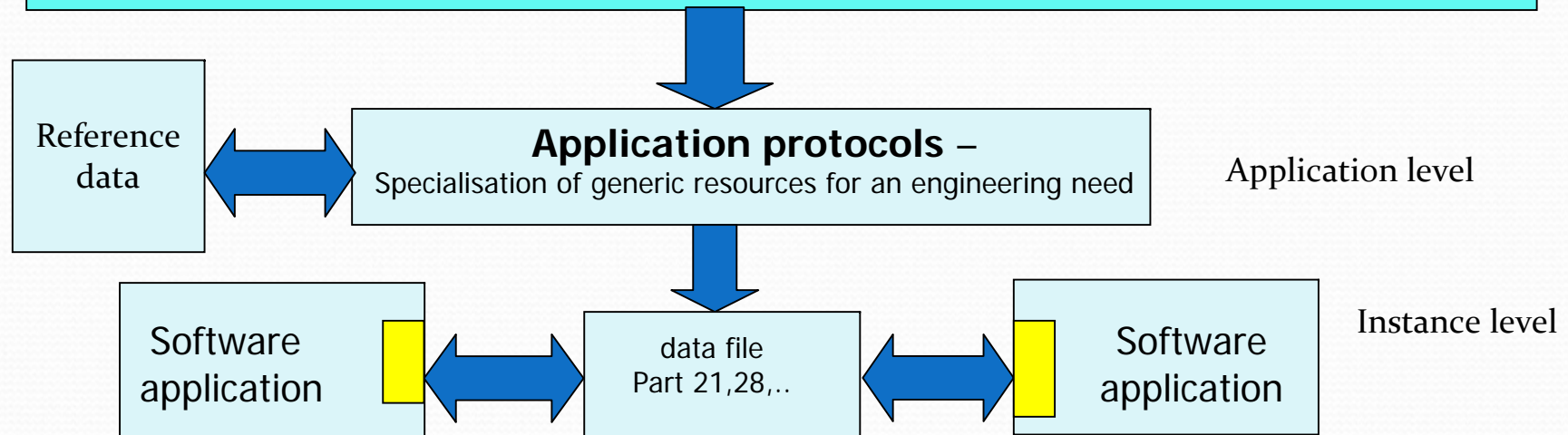
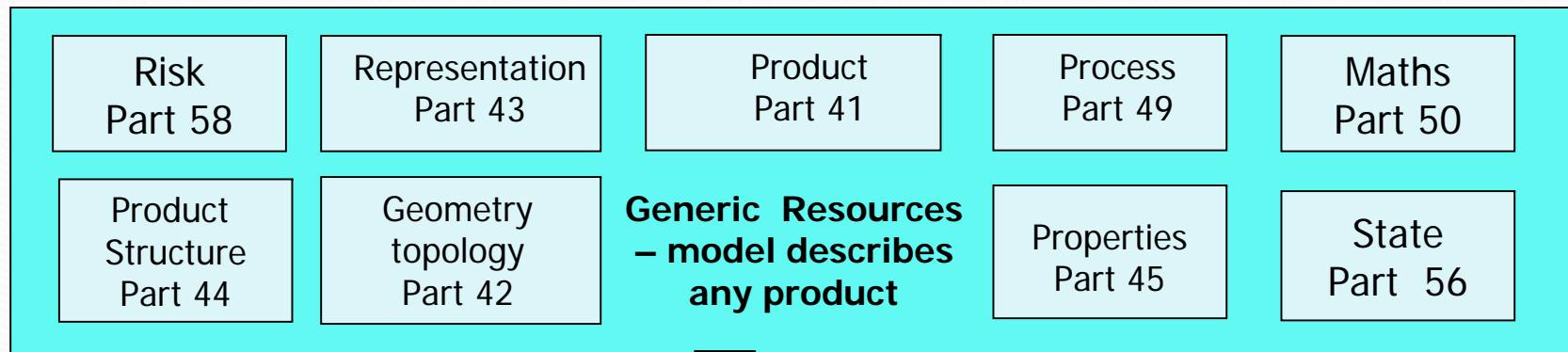
- An engineering solution to representation and communication
  - Developed in a global project by ISO TC184/SC4
- Specify representation of technical information by standardised information models
- The information models:
  - Written in the EXPRESS modelling language
  - Have explicit rules for interpretation of the data items
- Computer-understandable within an engineering domain
  - Standardised interfaces and convertible to XML
- Independent from any computer software system
  - Life time of products is longer than the life time of software

# Product data technology in manufacturing





# ISO 10303 Product data representation and exchange



# ISO 10303 and properties

- A property value for a product has to be associated with a data environment (metadata) that defines its validity
- *ISO 10303-45 Material and other engineering properties (1998 and 2008)*
- Meaning (semantic) of an engineering property is defined by a measurement process
- *ISO 10303-235 Engineering properties for product design and verification (2009)* : schema for the measurement of any property of any product by any process
  - Names of processes and their properties can be defined in a reference data conforming to ISO 13584 Parts library or by using OWL/RDF ontologies



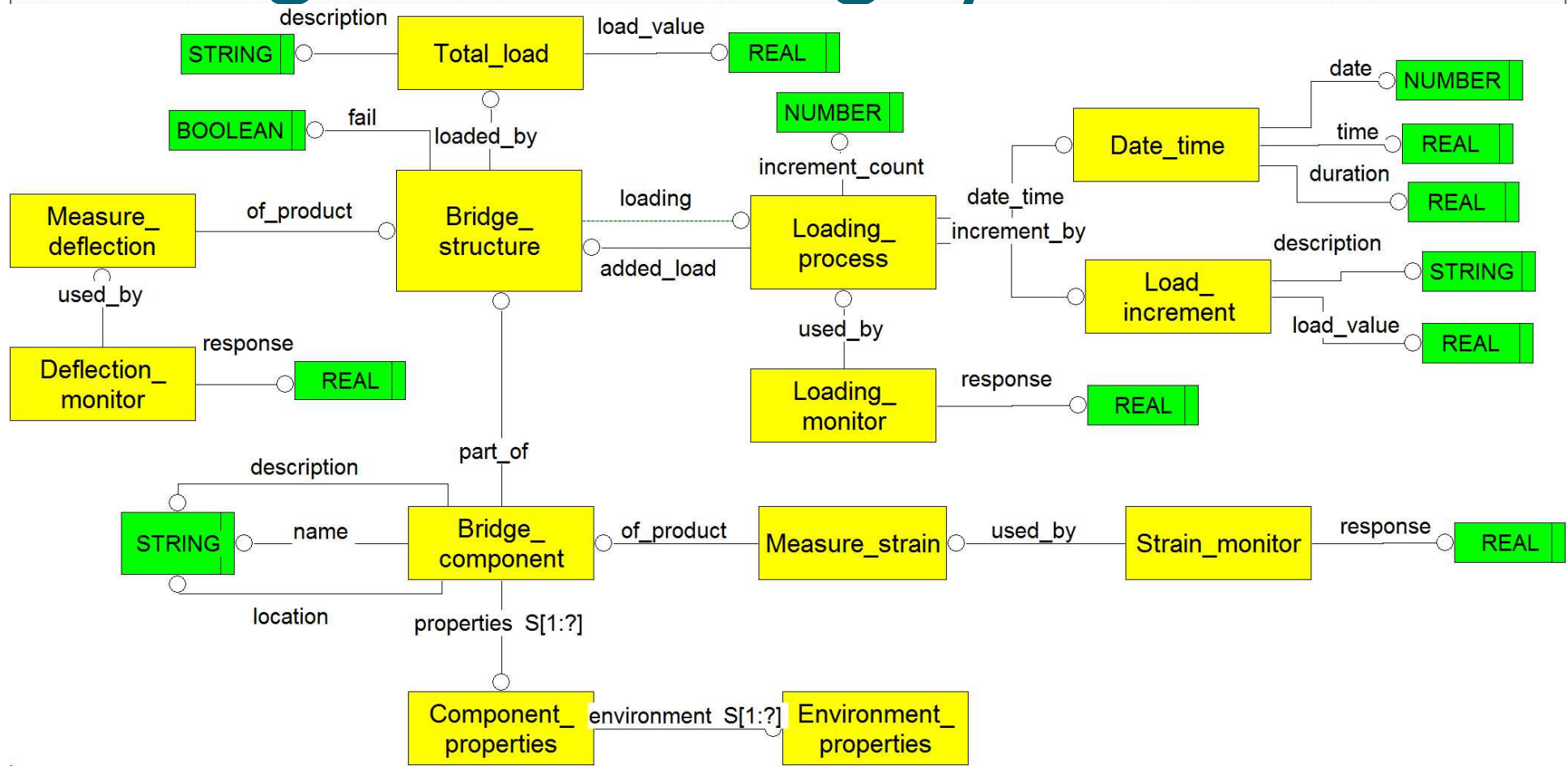
# Scope of ISO 10303-235

- *Products*
- *Properties*
- *Processes*
- *Numerical values*
- Maths values
- Substance composition and structure
- State
- Tolerances
- Uncertainty, reliability
- Persons, organisations
- Approvals, qualifications, certification
- Documents, files
- External references
- Effectivity
- Language, *Locations*
- Requirements
- *Resources*

# How to apply ISO 10303-235

- Model the application scenario – e.g the NPL bridge
- Map the scenario items onto the ISO 10303-235 schema
- Check the validity of the mapping :
  - Populate the structure with examples of instances of data from the scenario
  - Generate data files confirming to ISO 10303-21 (ASCII text) or ISO 10303-28 (XML)
- Develop a software implementation to achieve the same result so that the application is invisible to the user
- Aggregate the output of different data streams in the same information structure – sustainable engineering information

# Bridge monitoring system





# Conclusions

- Product data technology has been a global success
- Applications are in : aerospace, manufacturing, ship design and construction, defence, chemical process plant, offshore oil & gas, composite material products, electronics, cutting tools, systems engineering, etc, etc.
- ISO 10303-235 can represent any property for any product measured by any method.
- Projects to apply this technology to structural integrity will be welcomed.