

**BAE SYSTEMS**

**Affordable Air Dominance**



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## **PLM for the Eurofighter Typhoon**

*Howard Mason*

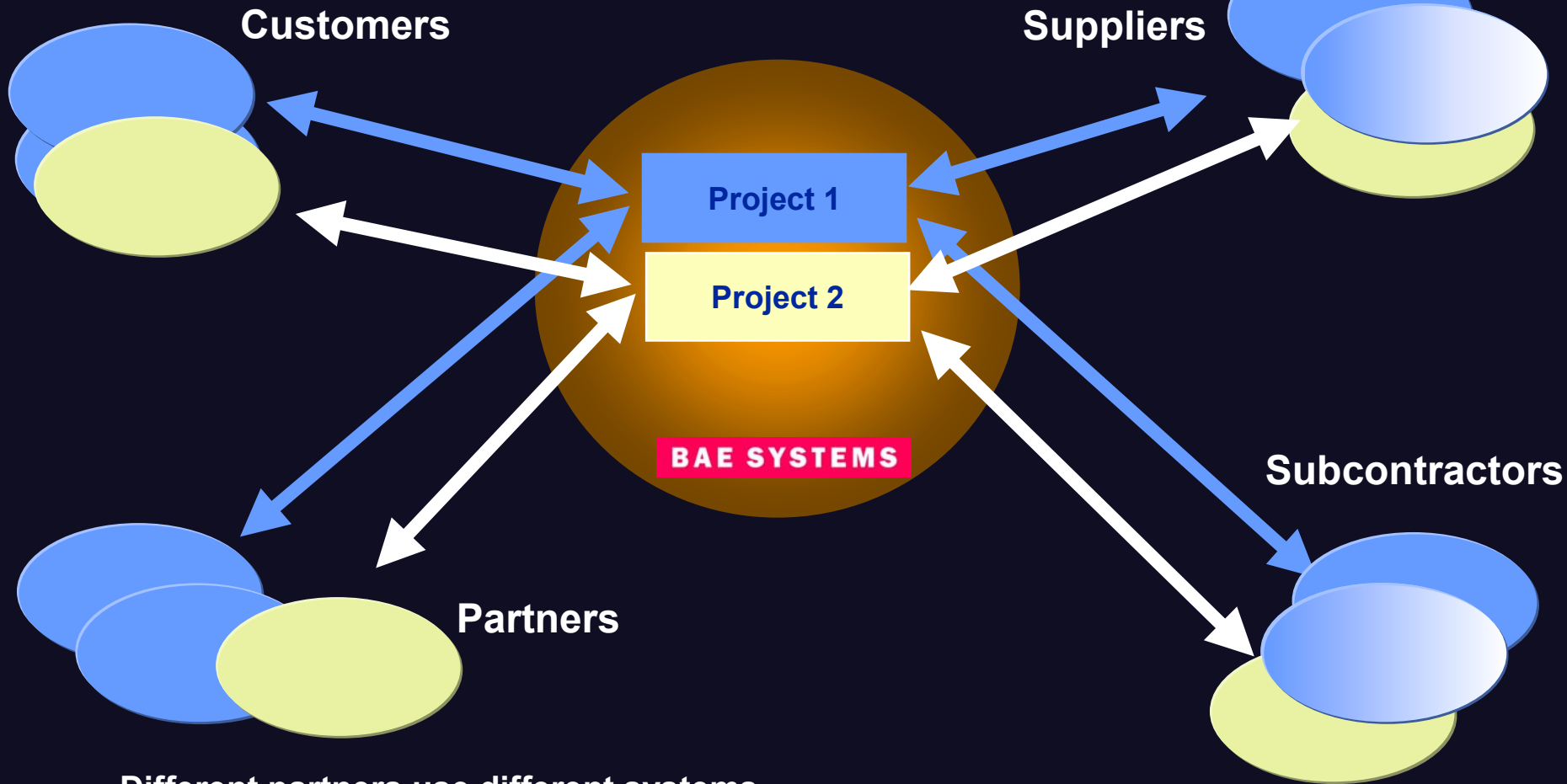
*IT and eBusiness*

*BAE SYSTEMS*

*Chairman, ISO TC184/SC4*

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# The 'Virtual Enterprise'



**Customers**

**Suppliers**

**Subcontractors**

**Partners**

**Project 1**

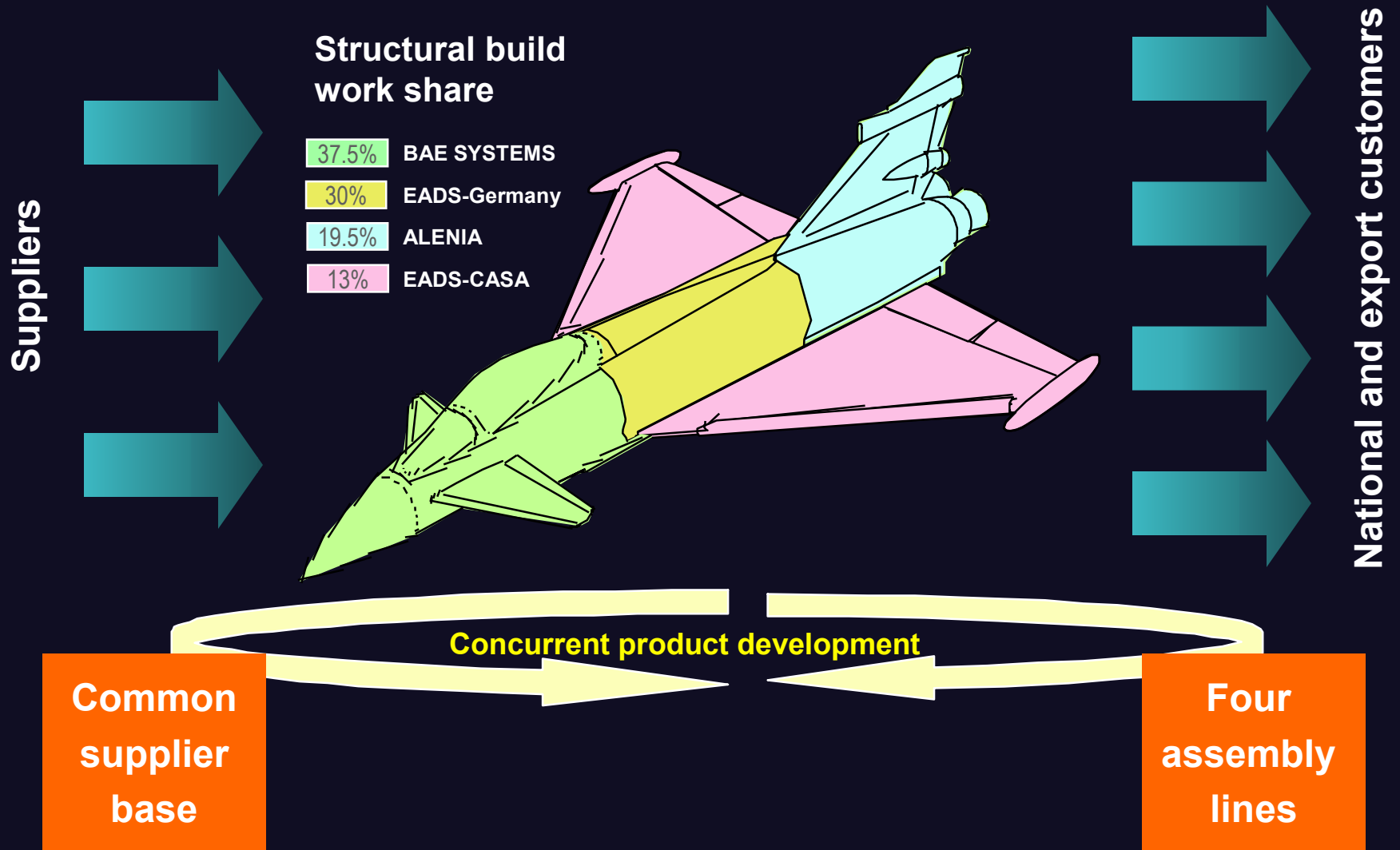
**Project 2**

**BAE SYSTEMS**

**Different partners use different systems**

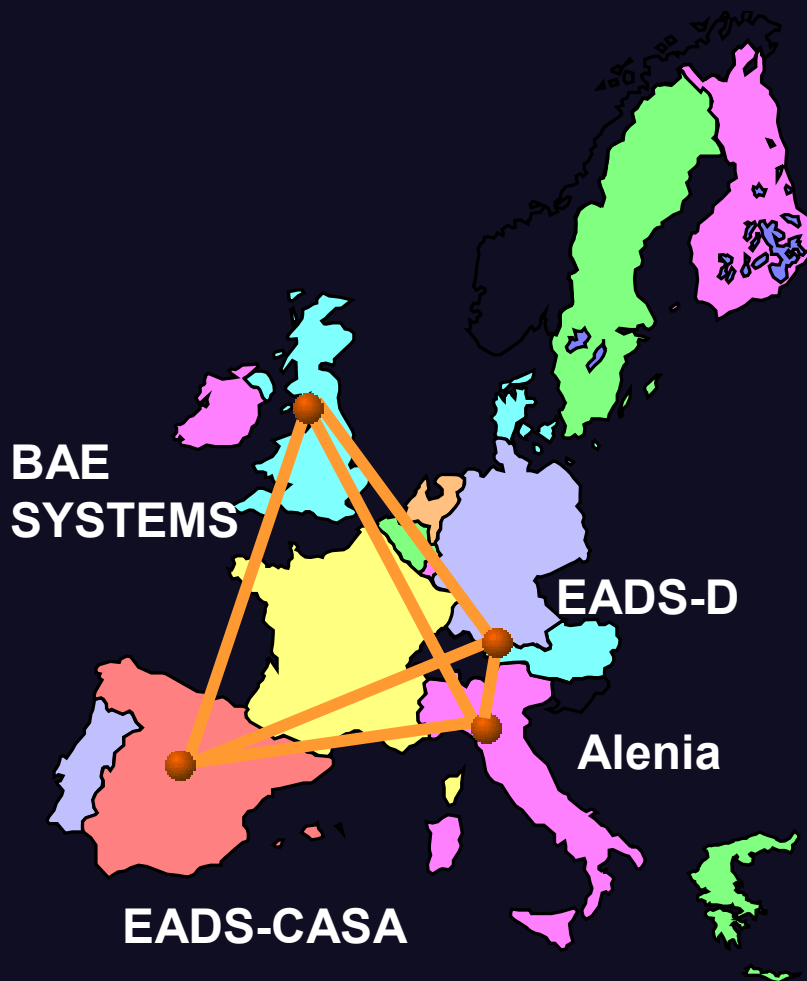
**Each project will involve a different configuration**

# Eurofighter Typhoon



# Eurofighter PDM Data Exchange

## The Challenge



- Partners use different PDM systems
  - ProductManager (BAE SYSTEMS, Alenia),
  - MetaPhase (EADS-Germany)
  - Optegra (EADS-CASA)
- Exchange required to support
  - Configuration management
  - Product Structure release
  - Design/Build Standard exchange
  - Links to electrics
  - Exchange of modifications

# Requirements

- **Manage Product Data using a PDM system**
- **Support Collaborative Engineering in a Partnership**
- **Deploy a solution reusable across projects**

# Options

## Option 1:

- All companies use the *same*:
  - PDM database
  - PDM application

## Option 2:

- All companies use a *copy* of the same:
  - PDM database
  - PDM application
  - exchange data

## Option 3:

- All companies use their *own* PDM systems
  - exchange data

# Option 1

- All companies use the *same*:
  - PDM database
  - PDM application

Company A



PDM  
application

Company C



PDM  
application

Company B



PDM  
application

Company D



PDM  
application

PDM  
database

# Option 1

## *Pros*

- **Staff flexibility**
- **Easy communication**
  - shared data
  - common application view

## *Cons*

- **Cost:**
  - Application purchase
  - Training
- **Loss of Integration to downstream processes**
- **Slow response rate**



# Option 2

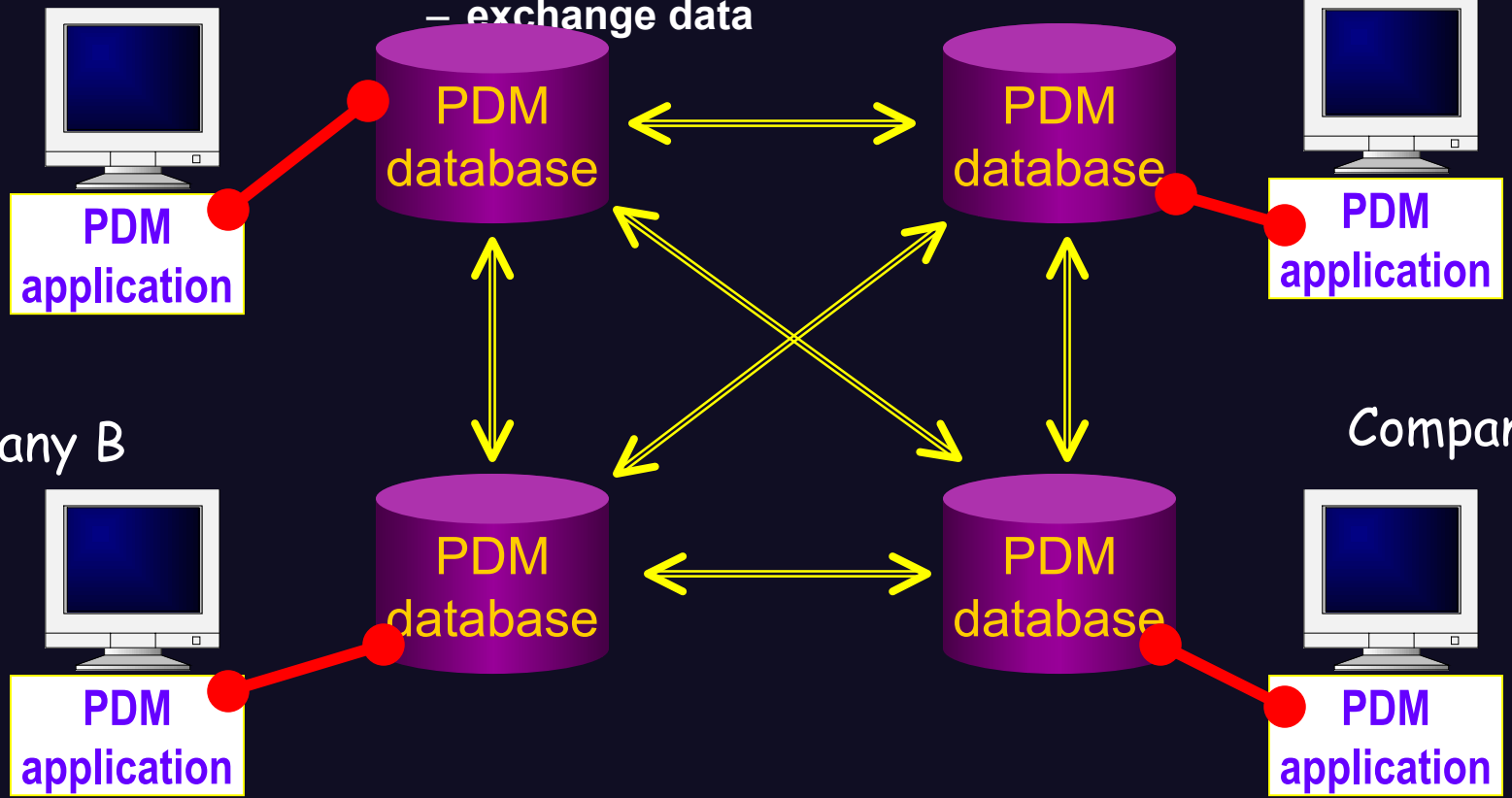
- All companies use a *copy* of the same :
  - PDM database
  - PDM application
  - exchange data

Company A

Company C

Company B

Company D



## Option 2

### *Pros*

- **Staff flexibility**
- **Easy communication**
  - **shared data**
  - **common application view**

### *Cons*

- **Cost:**
  - **Application purchase**
  - **Training**
- **Loss of Integration to downstream processes**
- **Data exchange infrastructure**

# Option 3

- All companies use their *own* PDM systems:
  - exchange data

Company A



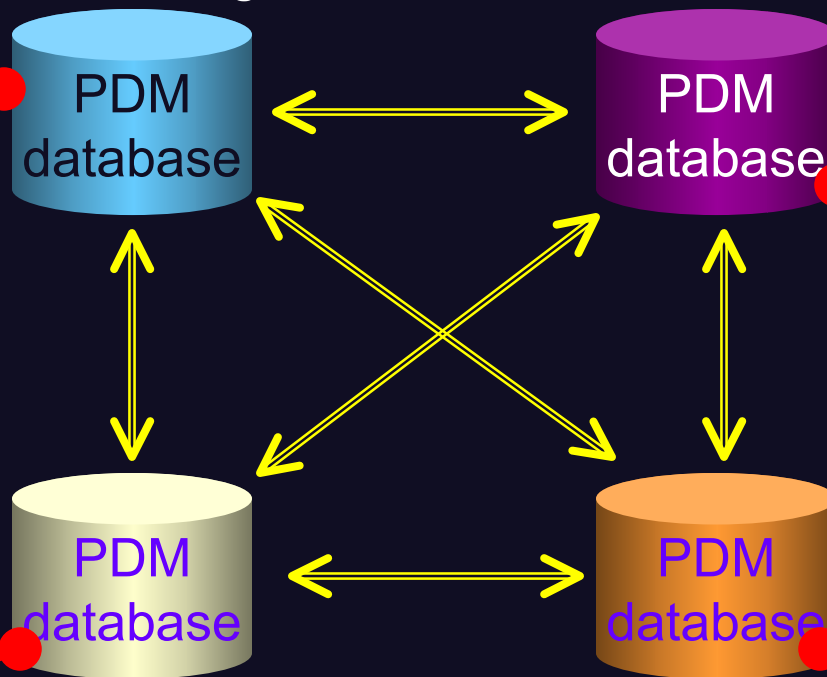
Company C



Company B



Company D



## Option 3

### *Pros*

- No additional PDM purchase
- No training in new systems
- Downstream processes integration in place

### *Cons*

- Staff flexibility required
- Difficult communication
  - no common application view
- Data exchange infrastructure required

## Eurofighter PDM Options

- Each company runs many projects
- Common downstream infrastructure



- Any proposal to all use the same PDM system is:

**• NOT AN OPTION**

## Data exchange options

- **Use our own data exchange format**
  - will not carry over to the next aircraft programme
  - significant work in defining the data exchange format
  - need a translator for every exchange pairing
- **Aerospace industry common messaging (AECMA)**
  - does not cover scope of data
  - European not International standard

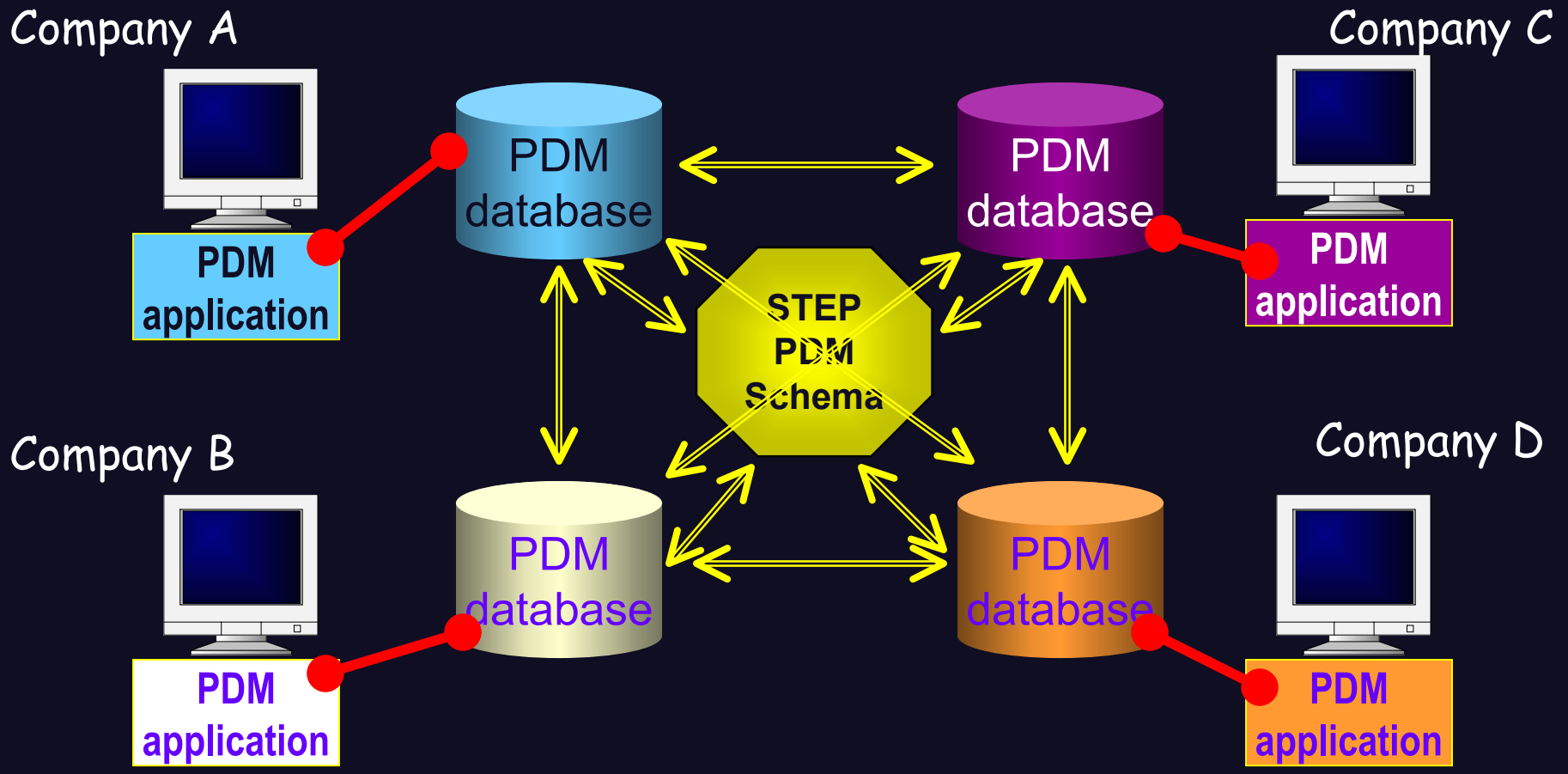
## Strategy

- A single technical solution for all uses
- Reduce costs for all of our virtual enterprises
- Use of standards
- International acceptance

**STEP PDM Schema**

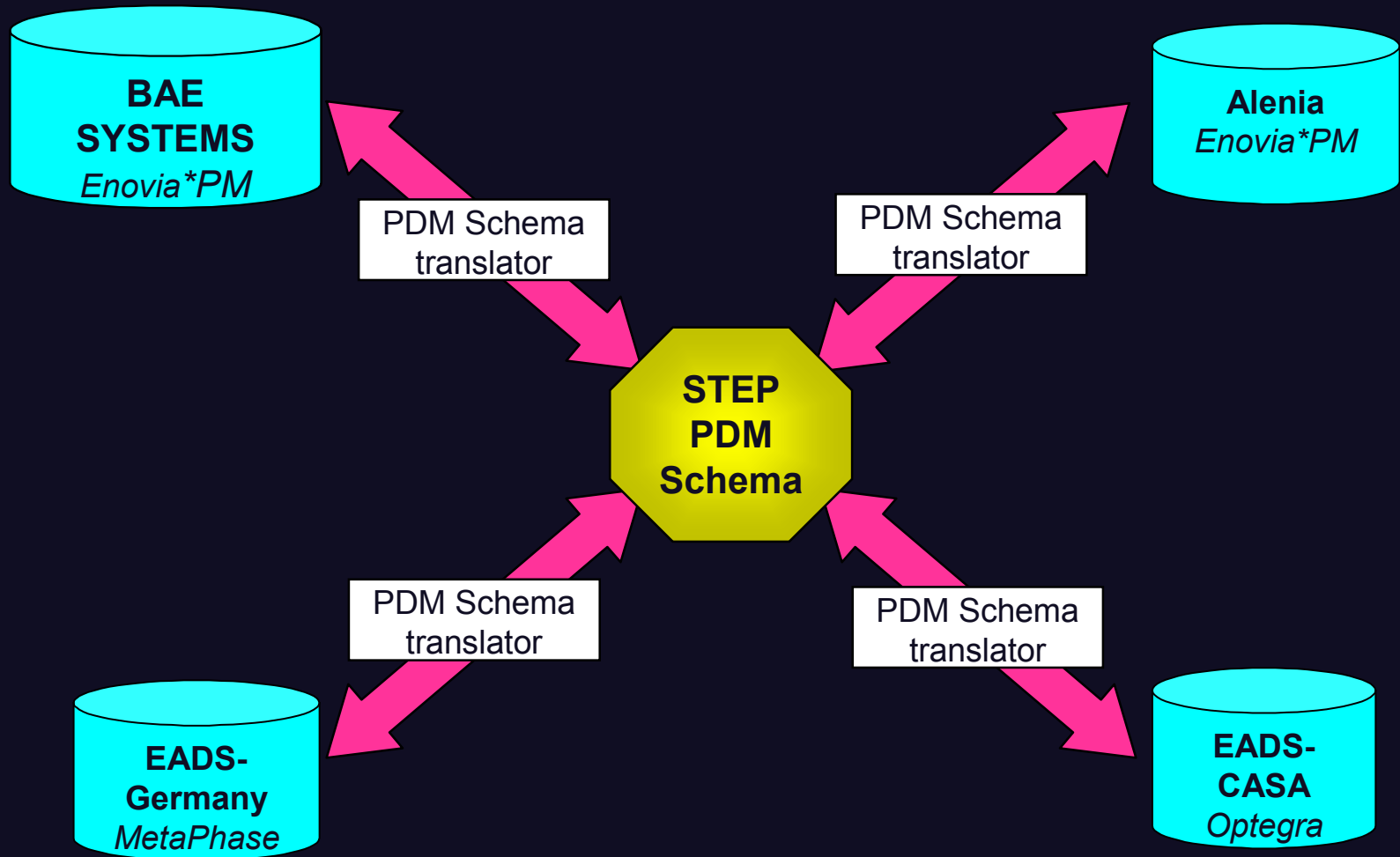
# STEP exchange

- Need a translator for every exchange pairing
  - Need 2N translators
- $N^2 - N$  translators!





# Solution

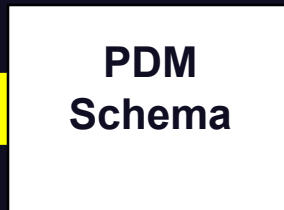
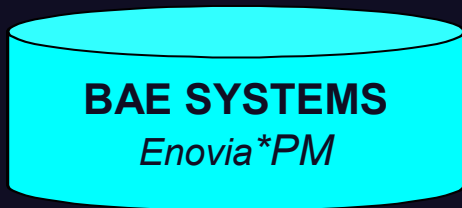




Agree scope & meaning of data

*Implement translator*

*Map to PDM Schema*



## Status



- **Deployed in production on Eurofighter**
- **Currently being used for exchange of configuration management and build standard data**
- **Savings resulting from:**
  - **Elimination of manual BoM extraction**
  - **Elimination of manual model extraction**
  - **Reduced change requests**
  - **Improved data quality**

**Success Factors  
&  
Lessons Learned**

# Success Factors

- **Commitment**
- **Ownership**
- **Resources**

# Success Factors



Ag  
me

- Understand process
- Agree terms

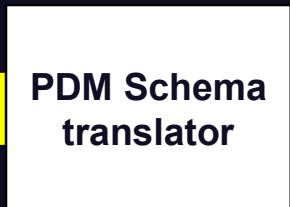
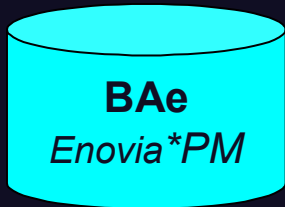
- Stable standard
- Usage guide
- Expert Help
- Scope of standard

- COTS
- Skilled resource

- Deployment plan synchronised with PDM roll out

Map to  
PDM Schema

Implement  
translator



# Benefits of STEP

- **Ready made Information Model**
  - Focus for agreement
- **Improved data exchange quality**
  - Information modeling based approach
  - Thorough and complete
  - Can validate data exchanged
- **Supports long term archiving**
  - Vendor neutral
  - Explicit information model
  - Implementation independent

# Business Benefits

- **Standards based**
  - Reusable solution for new projects
  - Lessons captured for future use
- **Facilitates collaborative engineering**
  - right data, at the right time, in the right format
- **Supports suppliers**
- **Matches customer strategy**



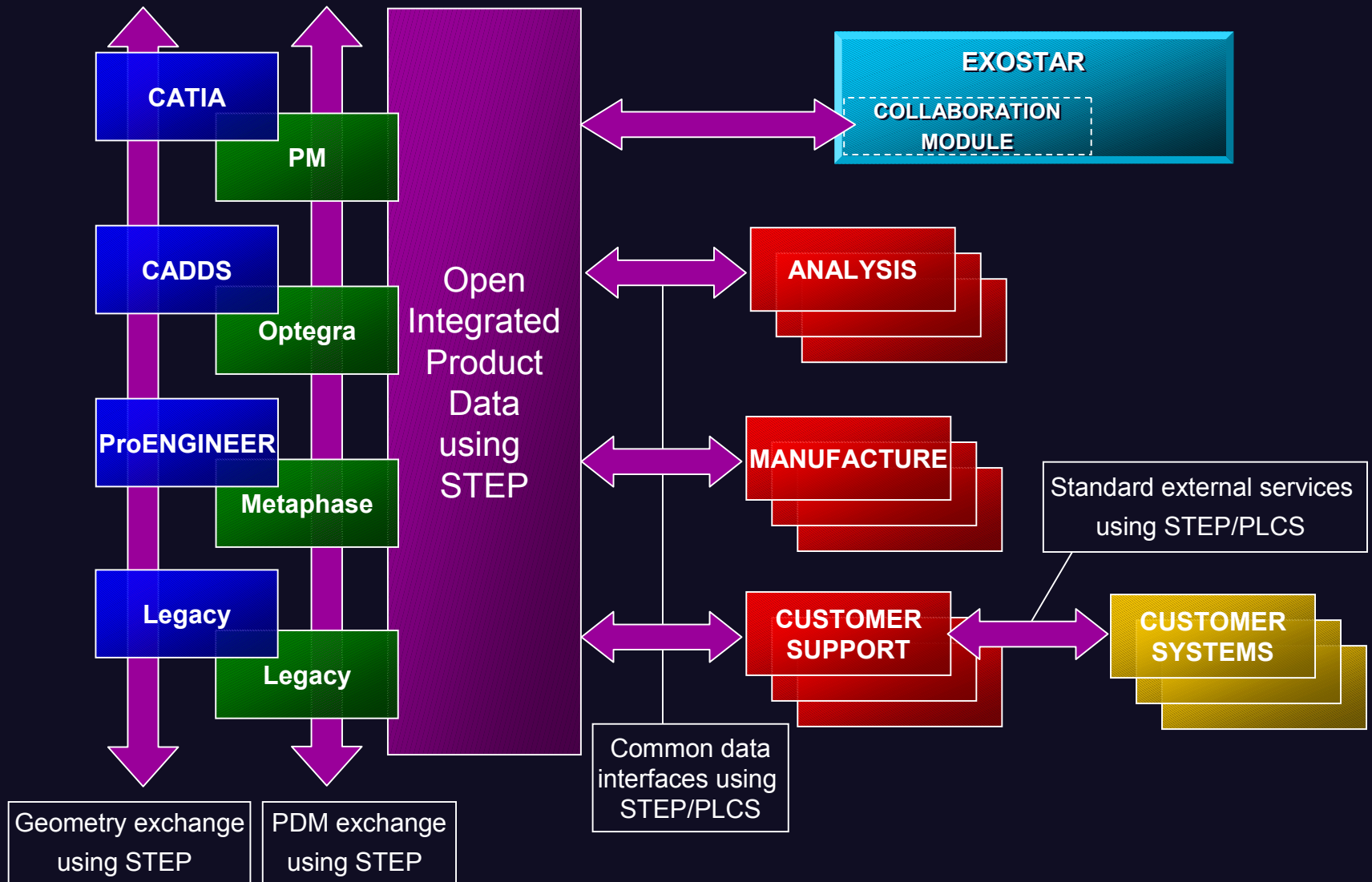
# Challenges

- **PDM Schema was State of the Art**
  - PDES, inc & ProSTEP still working on interpretation
- **Increasing Vendor support**
  - BAE SYSTEMS needed new skills
  - Scarce resource
- **Exchange exposes quality of process & product data**
- **Process ownership**
- **Deployment challenges**
  - New tools - Enovia\*PM
  - API limitations
  - Changes to process

## Building on success

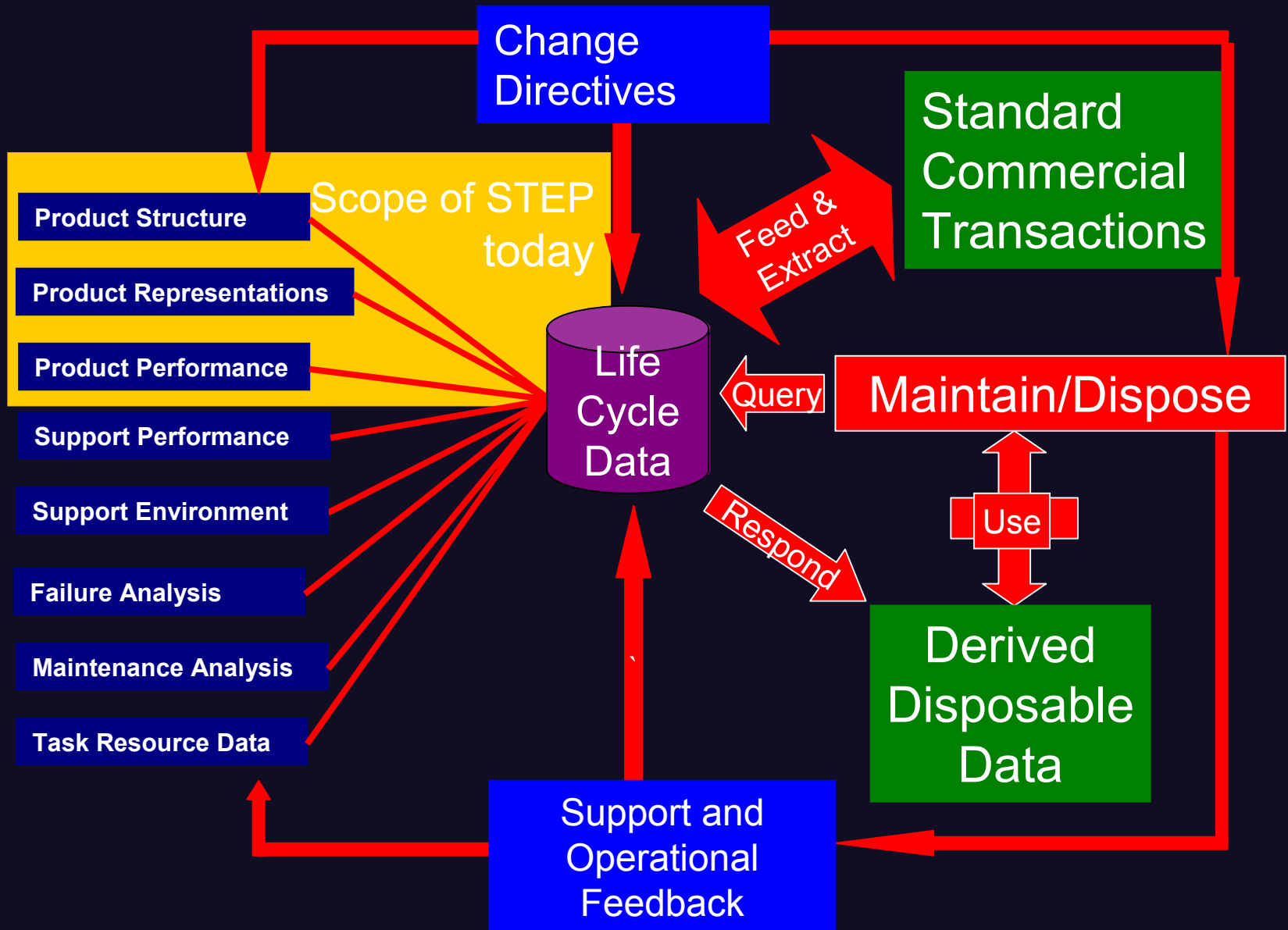
- **Supply chain**
  - only exchanged PDM data at a partner level
- **CAD**
  - Exchange of solid models for manufacturing
- **Technical Packaging**
  - packaging up data to send to suppliers
- **Analysis**
  - Structural analysis etc.

# Building on Success - across the enterprise



# Building on Success - The PLCS Initiative

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## Conclusion

- **STEP works for PDM**
- **STEP implementations are reusable**
- **STEP does give business benefit**
  - to the customer
  - to the prime contractor
  - to the supply chain
- **Validated in production on Eurofighter by independent audit**
- **See [www.eurofighter.com](http://www.eurofighter.com)**