COTS VS. CUSTOM – THE CONTINUOUS STRUGGLE

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As a big OEM, there are constant pressures to buy software vs. make it in-house

- Competing needs on keeping business processes proprietary to us, leading us to keep building software in-house.
- Maintain competitive advantage and other reasons include specific business processes that may not make sense to the software provider to include in their COTS solution.

resulting in sub-optimal solution set.

What are the principles to use that will enable us to fully leverage the solution set from the PLM providers and upgrade in to the latest versions in a timely manner without losing the ability to incorporate our specific business processes?

PROBLEM STATEMENT

RISKS AND CHALLENGES

- Commercial Software tends to be generic and agnostic to industry specific processes and methodologies
- Commercial Software does not adequately address the scale of big industry OEMs
- Usability is very subjective
- Cost of Customization and Configuration can become very high and delivery becomes slow
- Upgradability also becomes a challenge

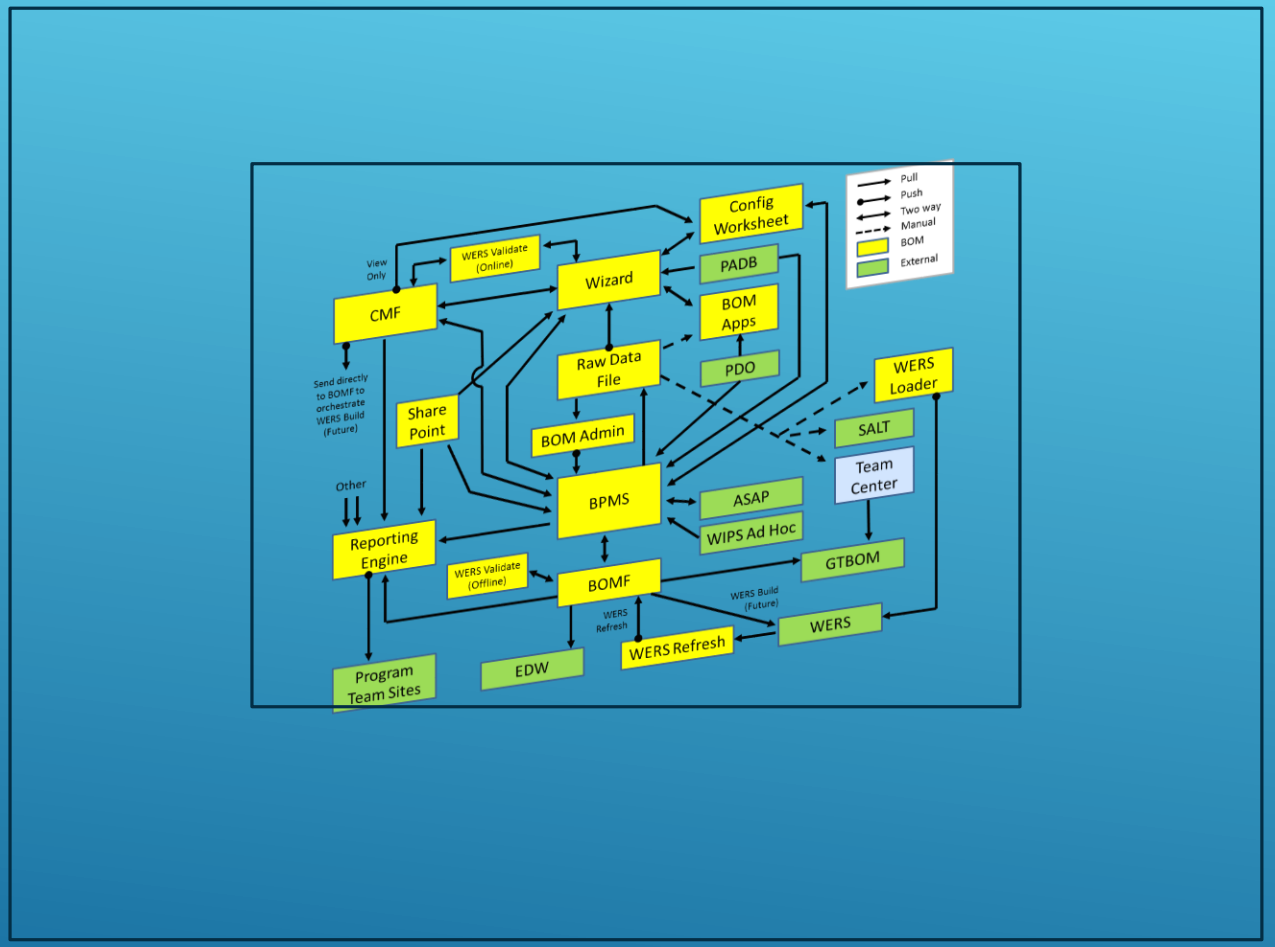
SOLUTION LANDSCAPE

- Complex custom tool set → simplified modern state
- Volume of Data to migrate and locate
- Global, regional data sharing and availability
- Commercial upgrades mandating data migration
- Integrations providing robust ecosystem

COTS VS CONFIGURATION VS CUSTOMIZATION

- Definitions
  - COTS – Commercial off the shelf (plug in and play)
  - Configuration – Data Model, API, Automation of tedious tasks
  - Customization – Behavior change
- In each of the segments, the choice of implementation approach is selected to
  - Exploit the strengths of TC
  - Avoid the shortcomings of TC
  - Align with the future plans of FEDE and Siemens
  - Protect the Engineer's user experience as the highest priority
  - Avoid the past failure modes around 'bad' customizations
  - Similarly, avoid the past failure modes around overuse of OOTB

EXAMPLE #1



- Core of the ecosystem rebuilt with focus on data integration with FEDE/TeamCenter
- Existing user interfaces (Wizard, CWS, CMF) retained for step 1
  - Reduces time to Step 1 deployment
  - Enables thoughtful replacement of UI functions as Step 2+
  - Reduces engineers' training challenge
- Some BOM/CAD integration benefits "for free". Solid base to efficiently pursue others.

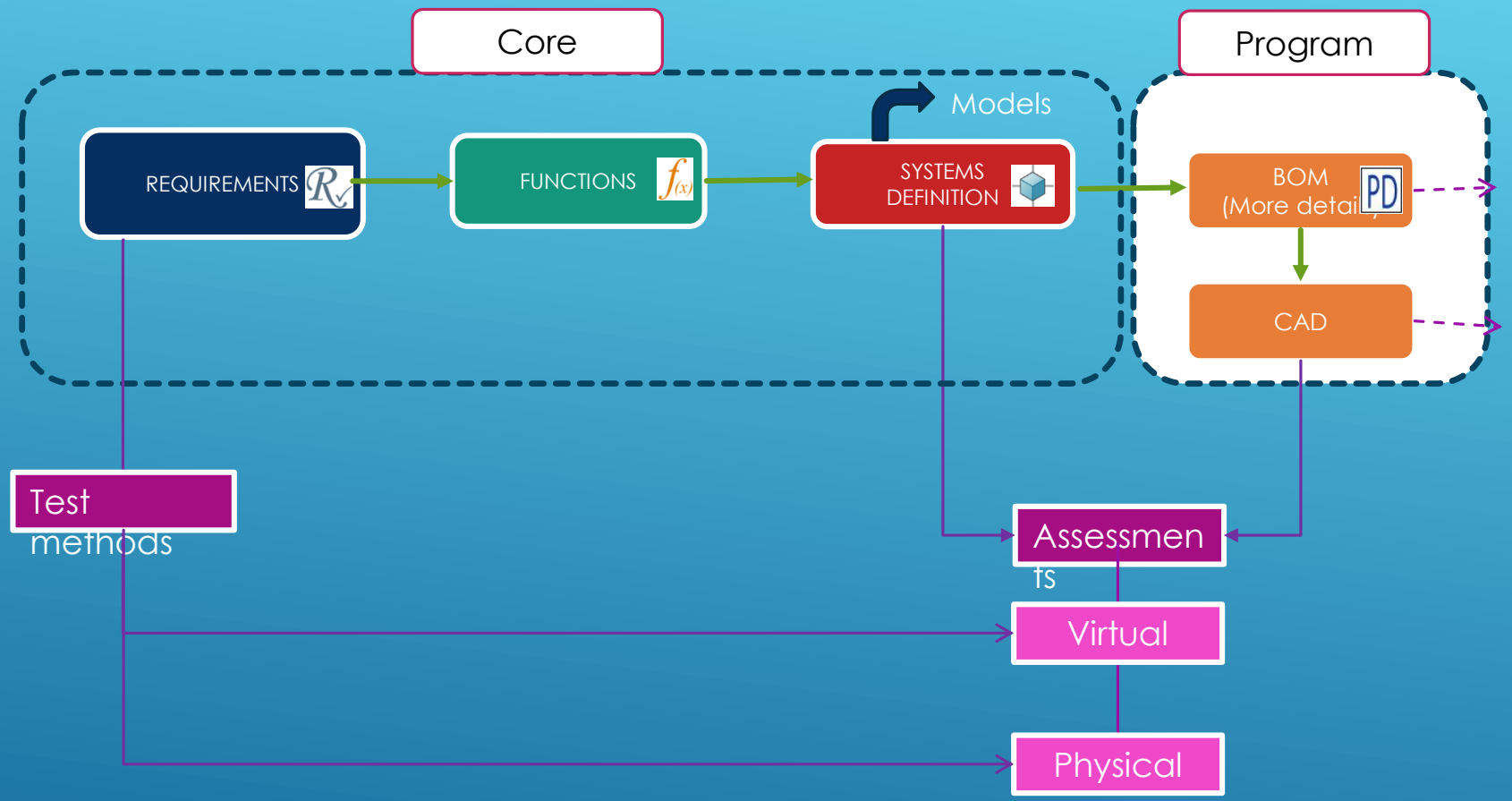
The study team recommends transitioning the current state BOMF and BPMS functionality and associated interfaces as Step 1 in the transition to a TeamCenter-based FEDE-aligned BOM future state

Segment	COTS	Configuration	Customization
Back End	80%	15%	5%
Business Logic	50%	25%	25%
Integrations / Services	60%	20%	20%
Presentation	25%	10%	65%

- High Level of COTS / Configuration in Back End activities to leverage the strengths of PLM, and existing Model Based Engineering and Management investments in infrastructure
- Business Process logic requires higher level of configuration and customization to incorporate Ford specific content that PLM can not handle natively
- Similarly, Integrations and Services that deliver Ford Business process-specific information carry higher levels of customization and configuration, but still relatively low compared to overall effort
- Presentation layer carries much higher levels of customization, as COTS PLM provides only a generic UI capabilities that do not address Ford Engineer's User Experience

EXAMPLE #1: DISTRIBUTION OF EFFORT

EXAMPLE #2


Core
Program
Models
REQUIREMENTS
FUNCTIONS
SYSTEMS DEFINITION
BOM (More detail)
PD
CAD
Test methods
Assessments
Virtual
Physical

COMPARISON BETWEEN THE TWO EXAMPLES

Example #2

Segment	COTS	Configuration	Customization
Back End	80%	15%	5%
Business Logic	50%	40%	10%
Integrations / **Services**	80%	15%	5%
Presentation	70%	20%	10%

Example #1

Segment	COTS	Configuration	Customization
Back End	80%	15%	5%
Business Logic	50%	25%	25%
Integrations / Services	60%	20%	20%
Presentation	25%	10%	65%

STRATEGIC CONSIDERATIONS

- Our implementations are partitioned into 3 distinct segments
  - Back-end
    - Persistence
    - Security
    - Performance and Scalability
    - Sharing between Engineering, BOM, Cost, Marketing, Service, etc.
    - Reporting
  - Business Process Logic / Integration / Services
    - Ford process specific and IP related code
    - Integration with external applications
    - Services for visibility of PLM information to the Enterprise
  - End User Presentation
    - Optimization of Engineer's experience
    - 'Modern' approach, with look and feel that appeals to the millennials
    - Converged, Intuitive UI
    - Flexibility to make frequent changes to tune the experience

BENEFITS OF CUSTOMIZATION

- Ability to implement Ford business specific aspects that will never be taken up by Siemens into core Teamcenter product
- Intellectual property protection and establishment of competitive advantage, for business process and methods that Ford does not intend share with Siemens (and the rest of Siemens customers)
- Reduces pressure on singular supply chain
- Application of latest IT technologies (parallel processing, big data/compute) into the PLM environment, even when Siemens plans do not have them in their roadmap

RISKS OF CUSTOMIZATION

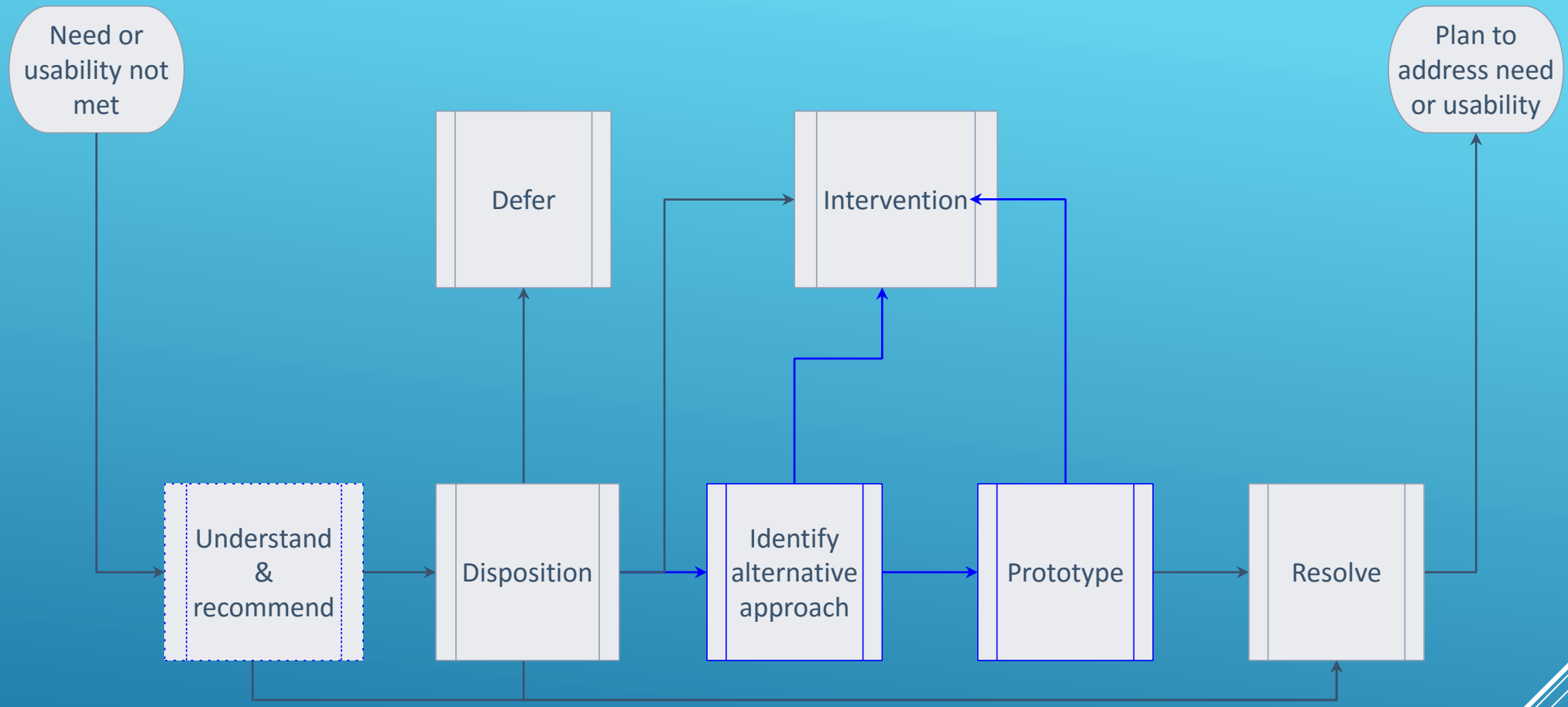
- One time development costs, ongoing maintenance costs and periodic upgrade costs to stay aligned with Teamcenter OOTB versions
- Narrow subject matter expertise difficult maintain in Ford and within supply base; real danger of configurations being orphaned in the future
- Over use due to the flexibility available, leading to future projects that eat up budgets and timing cycles
- Business/IT philosophy changes that will alter the risk/benefit perception

CUSTOMIZATIONS DO'S

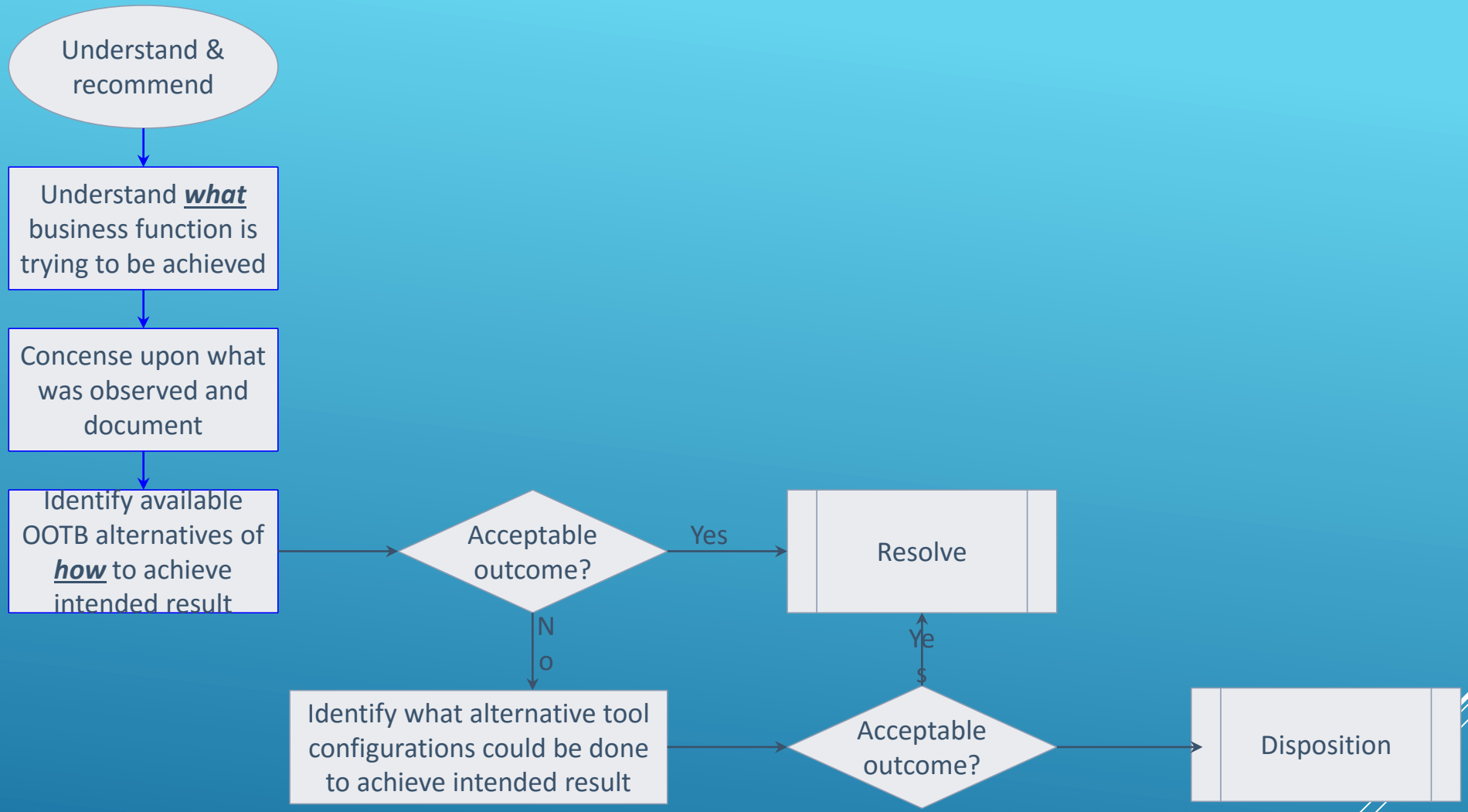
1. Utilize loosely coupled connections to Teamcenter
2. Architect solution to be modular regardless of what Teamcenter requires; design integration in the Teamcenter as a deliberate endeavor
3. Provide common entry and exit points for interaction with Teamcenter
4. Protect intellectual property and competitive advantage considerations, and the need to limit the amount of information shared with Siemens
5. Institute a stable, strong process to manage configuration portfolio and its lifecycle over time

1. Change the behavior that alters the OOTB behavior
2. Develop implementations that mimic (and therefore change with) Ford business process
3. Introduce capability without having an approach to sustain/alter or incorporate with products over time
4. Assume the risk/benefit profile associated with a configuration decision is invariant over time

CUSTOMIZATION DON'TS

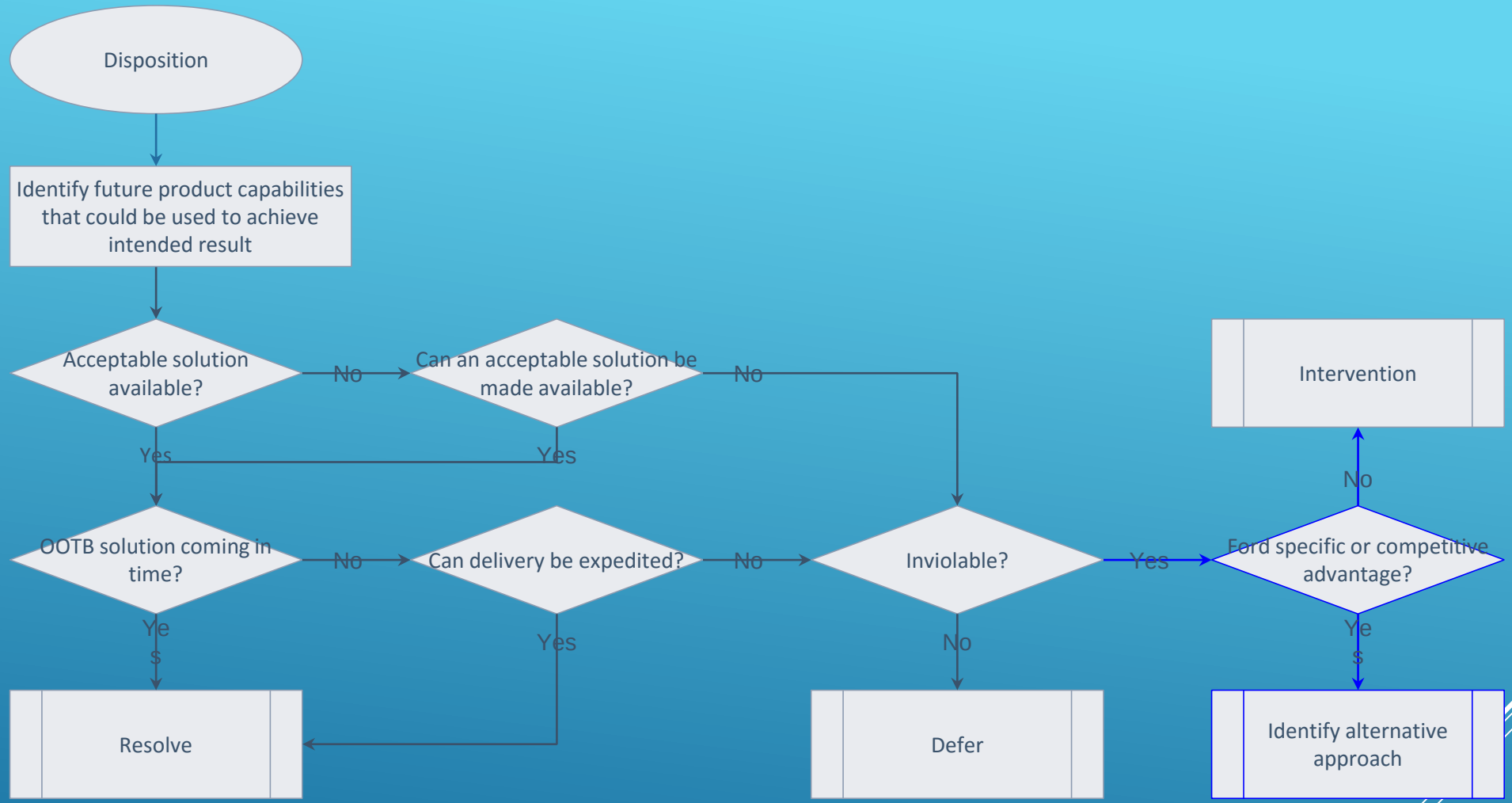


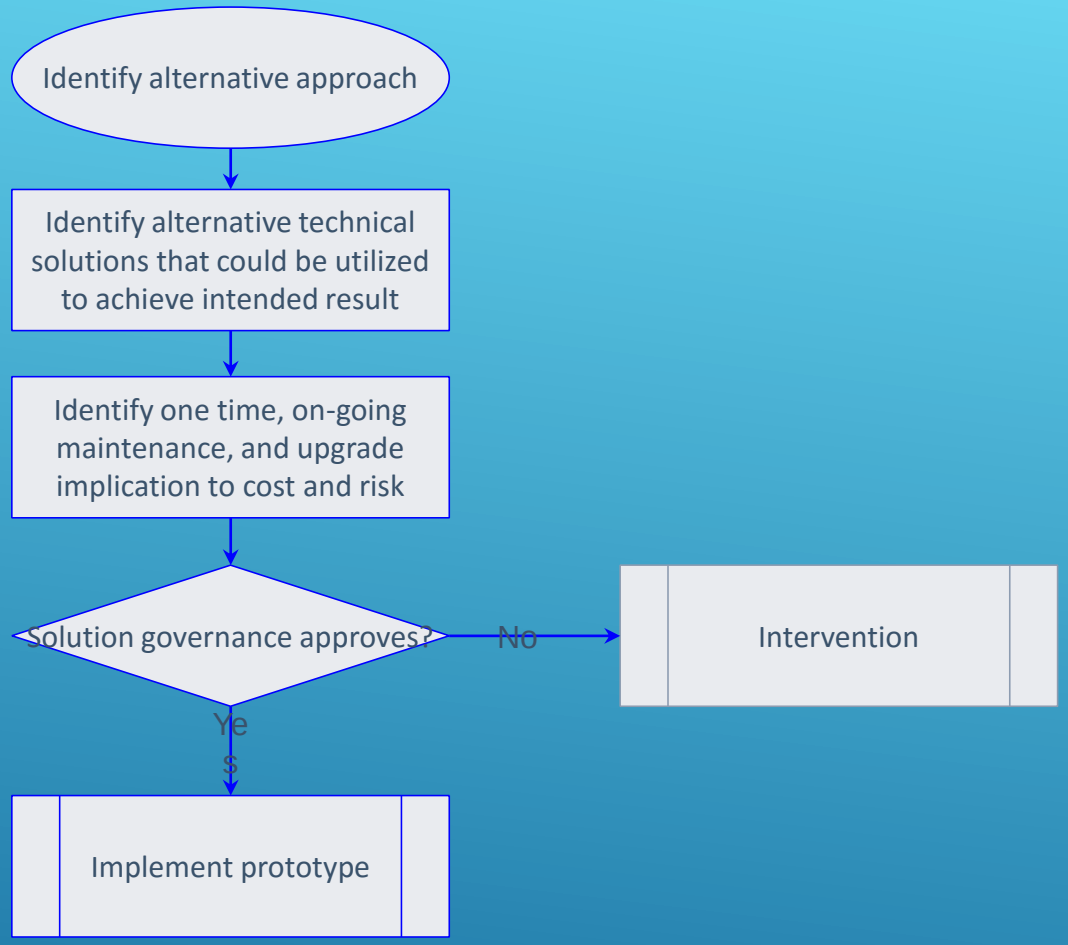
GAP CLOSURE -DECISION PROCESS STEPS



UNDERSTAND & RECOMMEND

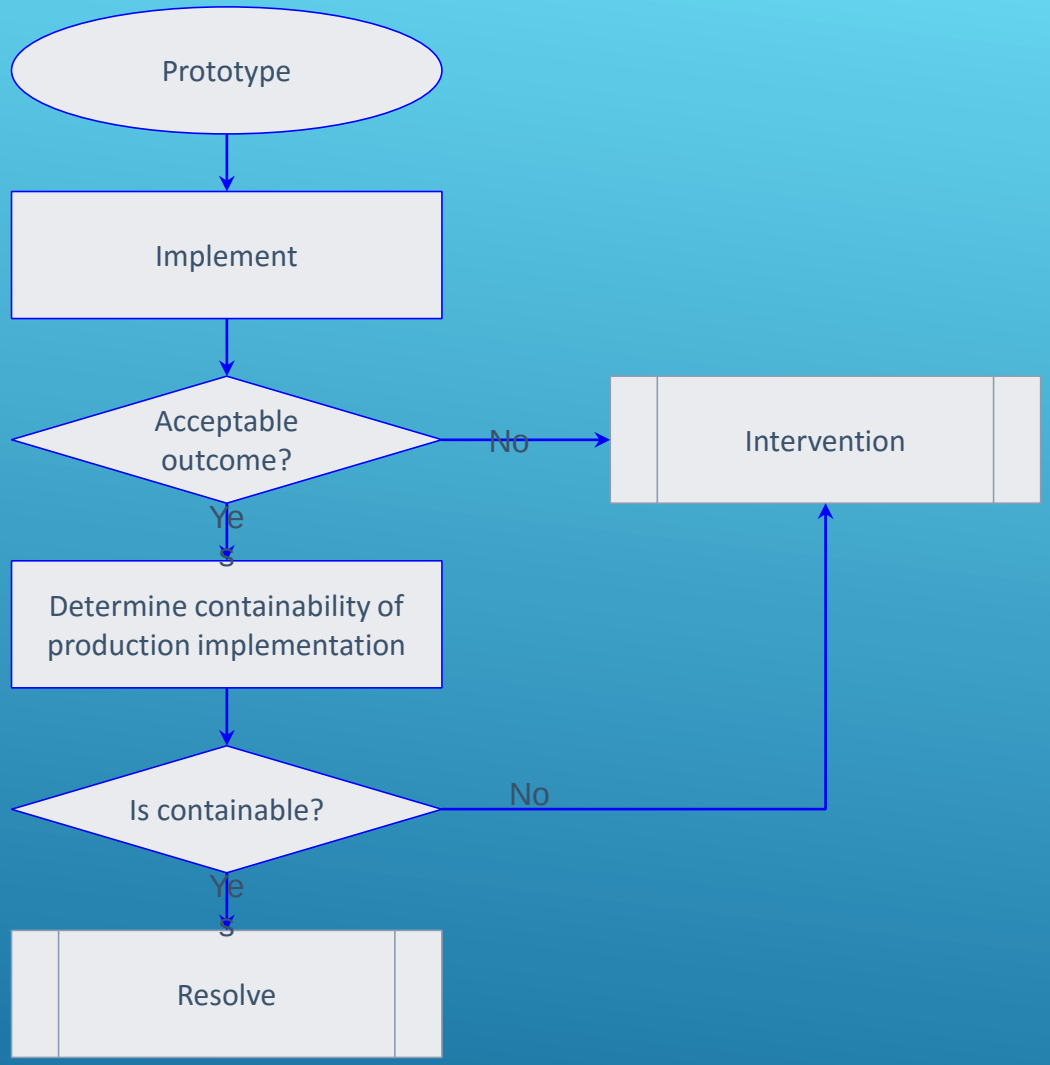
DISPOSITION





IDENTIFY ALTERNATIVE APPROACH

PROTOTYPE


Prototype
Implement
Acceptable outcome?
No
Intervention
Yes
Determine containability of production implementation
Is containable?
No
Yes
Resolve

PRODUCT LIFE CYCLE MANAGEMENT

- PLMs provide extensive facilities to tailor the COTS product to adapt to individual customer/business process needs
- Some of the adaptation can be carried out using so-called configuration features; however, for complex changes, advanced configuration is required
- By definition, advanced configurations alter or add to COTS PLM behavior; this creates branches that will need to be actively managed and potentially merged back into COTS PLM to manage cost and risk
- For those configurations that do not have a clear path for merger into COTS PLM, the risks and costs rise substantially, and the benefits need to be commensurate with this
- The risk/benefit profile of established configurations can change dramatically over time; hence, monitoring and evaluation needs to be done on a continuing basis

MODEL BASED DESIGN TOOLS

- Ability to create templates / custom libraries to implement business processes and enforce process discipline
- Need to stay in sync with the commercial releases
- Layer in the business process in a tool agnostic manner
- Avoid having multiple versions deployed at the same time

QUESTIONS?