



How Collaboration Models influences the view of Product Data

Presented By:

Nagraj Atlur

PLM Consultant

TATA Consultancy Services, Europe

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Tata Consultancy Services

- TCS was established in 1968
- FY 2011 revenue of USD 8.2 B
- Close to 200,000 employees
- 1st Company in the world to be assessed at Level 5 for integrated enterprise-wide CMMI and PCMM
- Global presence - 156 offices in 42 countries
- First and Largest
 - Software R&D centre in India
 - Software exporter in India



PLM Capability Snapshot

Performance Scorecard

1320

Number of PLM Consultants

61

Number of Active Engagements

16

Years of Presence

8

Among Global top 10 Independent SI by CIMDATA

1

Leader among Indian System Integrators

Operational Excellence

- Leverage TCS Quality Models - CMMi, PCMM, Six Sigma, ISO, BS7799 etc.
- KnowMax - Knowledge Sharing Globally
- Matured Competency Development Model (iCALMS)
- Geography, Practice & Delivery
- Synergy

Domain Presence

- Over 80 publications in leading PLM forums
- Participation in leading PLM events
- Academic interaction/ Internships

Products & Alliances

Product Vendor/Product		Partnership/Services
Siemens PLM	Teamcenter and Related Products	Strategic Partnership (TC SHF, TC MDD, DMD CAM)
Dassault Systemes	Enovia CATIA	DSP Partnership
SAP	SAP PLM	Global SI Partnership
PTC	Windchill	SI Partnership (NA & India)
Oracle	Agile	Global SI Partner



Collaboration in Product Development

Collaboration in Product Development

- Why do companies collaborate?
 - Business will “in-source” if costs of operating inside the firm was equal to or less than the costs of doing the same operation using another firm *
- Key reasons for collaboration in Product Development
 - Innovation can happen any where in Product Life Cycle**
 - Products are complex systems
 - Risk Pooling***
- Trend:
 - Organizations are moving towards a role of a Systems Integrator

Companies collaborate to build sustainable competitive advantage, to drive new revenue, quicken time-to-market, and increase innovation ****

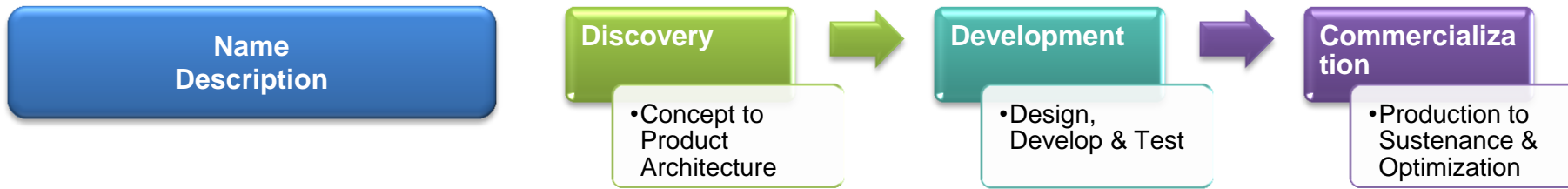
*R H Coase “The Nature of Firms”

** Eriv Von Hippel, *Sources Of Innovation*

*** Simchi-Levi, Kaminski and Simchi-Levi (2003)

**** Alan MacCormack, Theodore Forbath, Peter Brooks, Patrick Kalaher, *Innovation through Global Collaboration: A New Source of Competitive Advantage*, Harvard Business School.

Some Collaboration Models



Name	Discovery	Development	Commercialization
In House : Companies that do everything In-house. Generally small /medium sized companies	●	●	●
Manufacturing Outsourcing : Outsourcing manufacturing of entire products. IBM pioneered** this idea of when 1980s by getting SCI to build its personal computers	●	●	◐
Procurement Outsourcing : Company outsources procurement functions to suppliers with purchasing infrastructure to acquire components.*	●	◐	◐
Design Outsourcing : There are multiple approaches to design outsourcing. Companies may outsource design and/or development of the product or may outsource design and manufacture to an original design manufacturer (ODM).*	●	◑	●
Licensee : The licensee is responsible for the actual manufacturing of the product based on the company's design.	●	◐	◐
Contract Manufacturing : This is the practice of making products or subcomponents of products to be sold under a different company's brand name.	◐	◐	◑

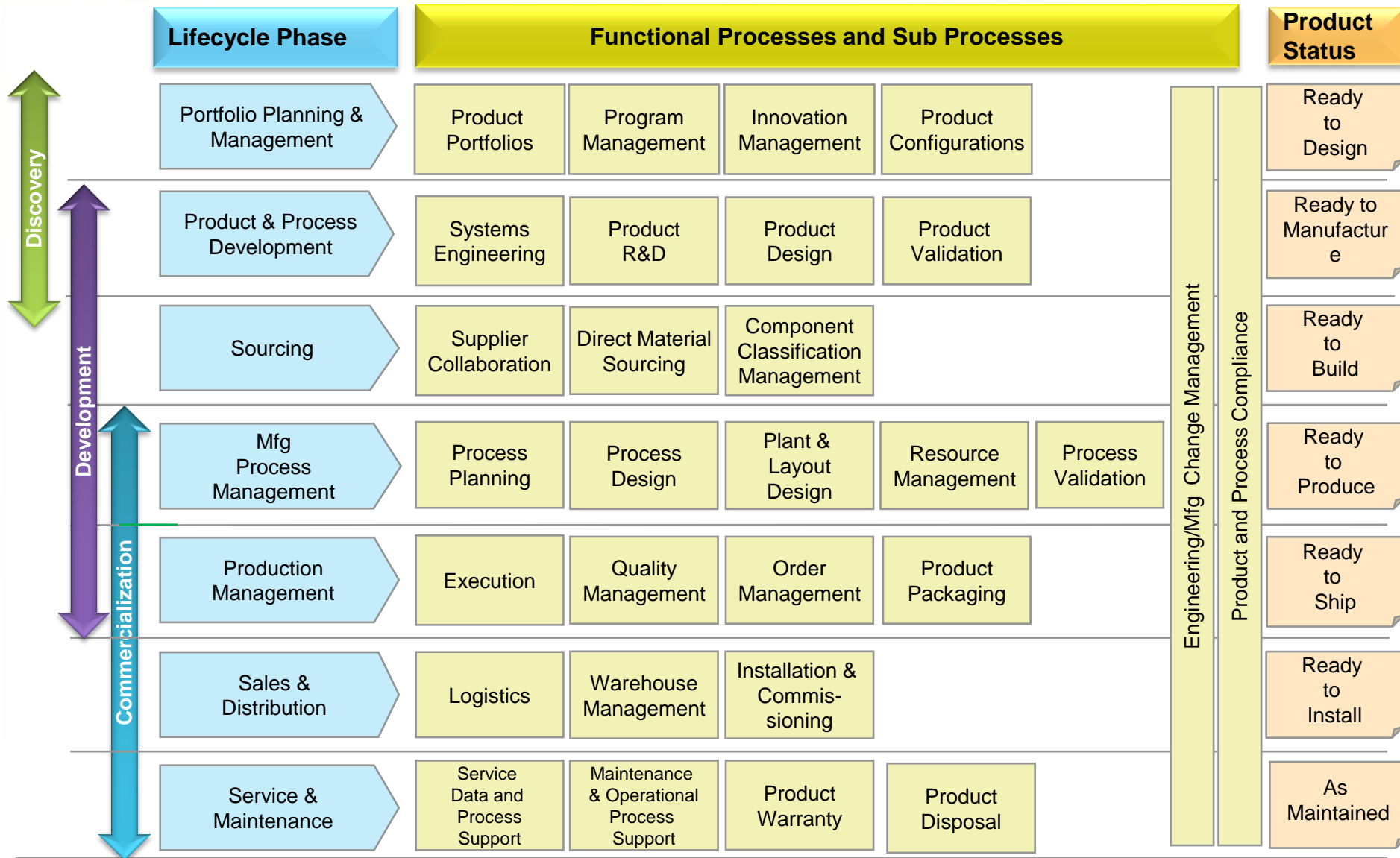
None of the collaboration models are mutually exclusive

* Bindiya Vakil 2005, Design Outsourcing in the High-Tech Industry and its Impact on Supply Chain Strategies (MIT)

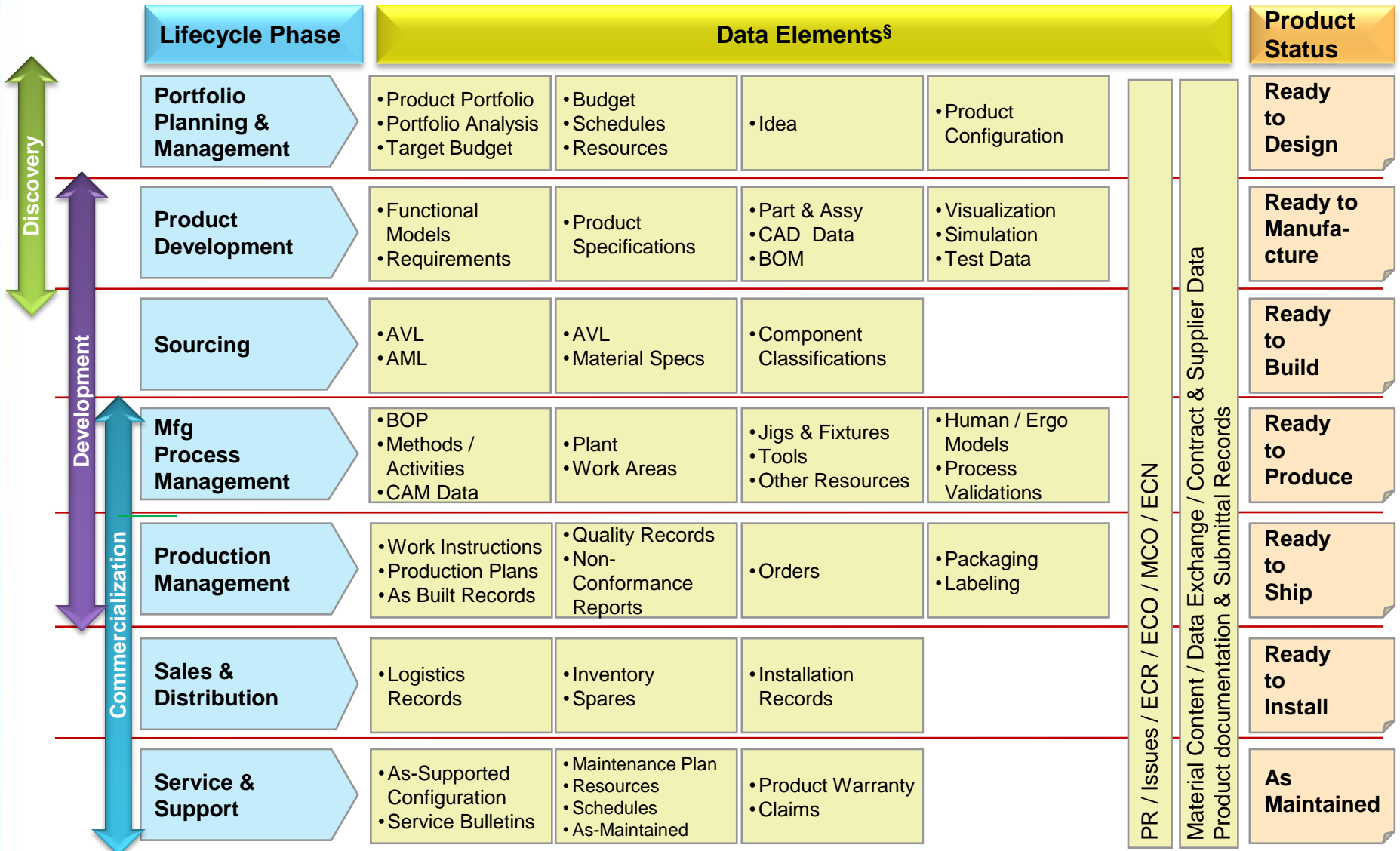
**The Economist 2000

***://www.sme.org/downloads/communities/techgroups/plm/matrix.pdf

TCS Product Lifecycle Reference Model



Product Data across Lifecycle



[§]Representative



Effect of Collaboration Models

Collaboration: None (In Source)

Lifecycle Phase	Data Elements						Company
Portfolio Planning & Management	<ul style="list-style-type: none"> Product Portfolio Portfolio Analysis Target Budget 	<ul style="list-style-type: none"> Budget Schedules Resources 	<ul style="list-style-type: none"> Idea 	<ul style="list-style-type: none"> Product Configuration 	PR / Issues / ECR / ECO / MCO / ECN	Material Content / Data Exchange / Contract & Supplier Data Product documentation & Submittal Records	
Product Development	<ul style="list-style-type: none"> Functional Models Requirements 	<ul style="list-style-type: none"> Product Specifications 	<ul style="list-style-type: none"> Part & Assy CAD Data BOM 	<ul style="list-style-type: none"> Visualization Simulation Test Data 			
Sourcing	<ul style="list-style-type: none"> AVL AML 	<ul style="list-style-type: none"> AVL Material Specs 	<ul style="list-style-type: none"> Component Classifications 				
Mfg Process Management	<ul style="list-style-type: none"> BOP Methods / Activities CAM Data 	<ul style="list-style-type: none"> Plant Work Areas 	<ul style="list-style-type: none"> Jigs & Fixtures Tools Other Resources 	<ul style="list-style-type: none"> Human / Ergo Models Process Validations 			
Production Management	<ul style="list-style-type: none"> Work Instructions Production Plans As Built Records 	<ul style="list-style-type: none"> Quality Records Non-Conformance Reports 	<ul style="list-style-type: none"> Orders 	<ul style="list-style-type: none"> Packaging Labeling 			
Sales & Distribution	<ul style="list-style-type: none"> Logistics Records 	<ul style="list-style-type: none"> Inventory 	<ul style="list-style-type: none"> Installation Records 				
Service & Support	<ul style="list-style-type: none"> As-Supported Configuration Service Bulletins 	<ul style="list-style-type: none"> Maintenance Plan Resources Schedules As-Maintained 	<ul style="list-style-type: none"> Product Warranty Claims 				

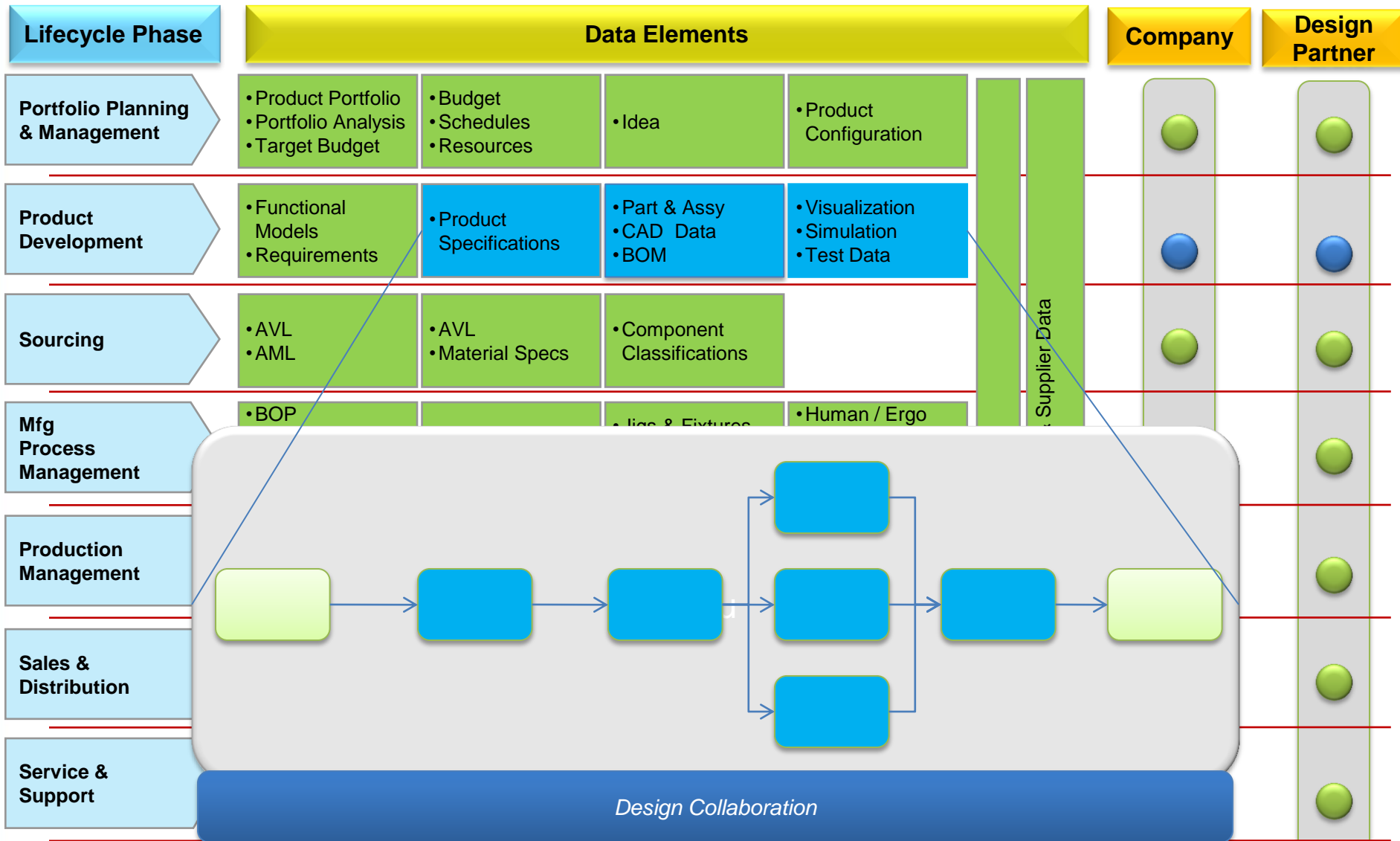
Collaboration: Design

Lifecycle Phase	Data Elements				Company	Design Partner		
Portfolio Planning & Management	<ul style="list-style-type: none"> Product Portfolio Portfolio Analysis Target Budget 	<ul style="list-style-type: none"> Budget Schedules Resources 	<ul style="list-style-type: none"> Idea 	<ul style="list-style-type: none"> Product Configuration 	PR / Issues / ECR / ECO / MCO / ECN	Material Content / Data Exchange / Contract & Supplier Data Product documentation & Submittal Records	●	●
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Legend

- Data Managed Internally
- Shared Data

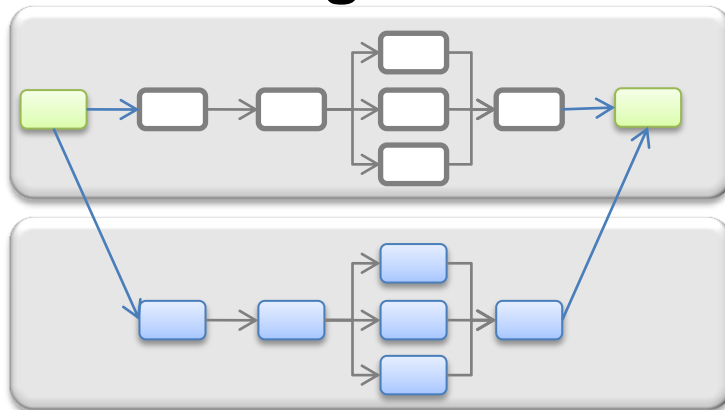
Collaboration: Design



Legend

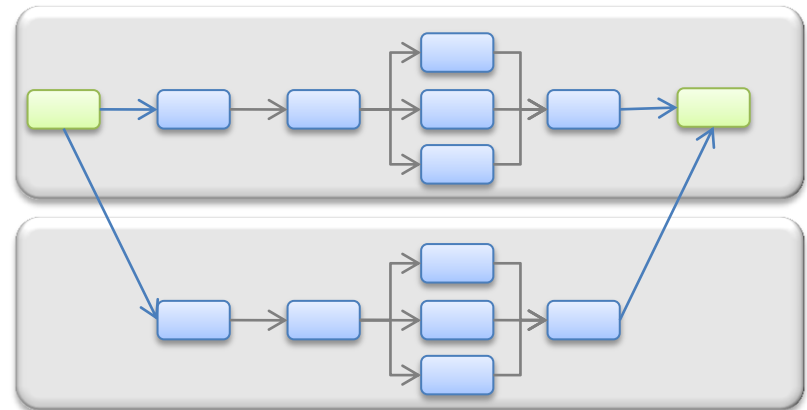
- Data Managed Internally
- Shared Data

Complete Design Outsourcing



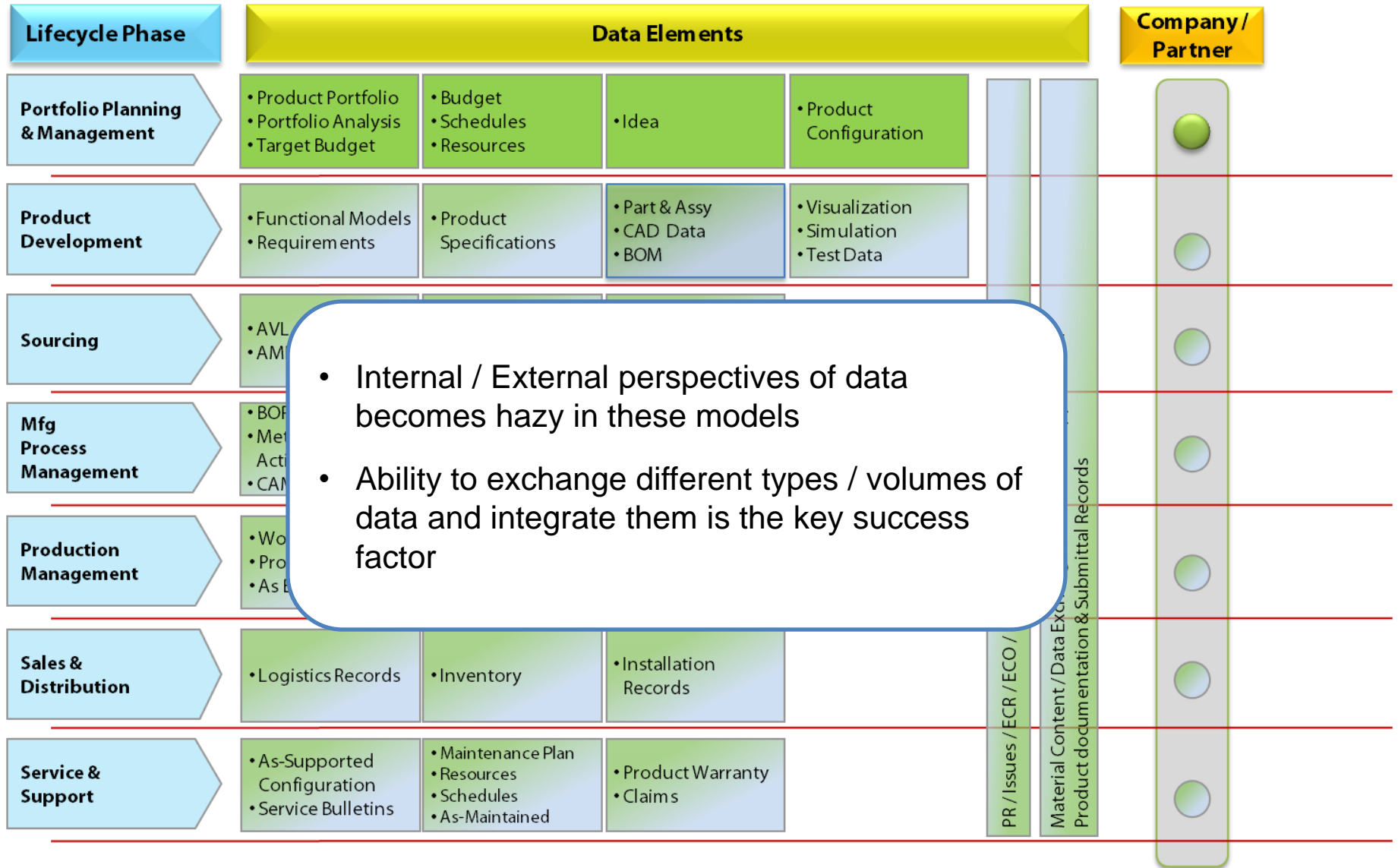
- Company is primarily interested in ensuring the product design is created as per specification
- Company does not manage in-process Product Data during development
- Contractual agreements will drive if company gets ownership of product data
- Company may view upstream data such as requirements & downstream data such as BOP, MBOM as internal and the specifications, design output as data to share (external)

Design Partnership



- Company works with a partner for product design
- Involves extensive interaction between the company & supplier
- Product data exists in both company and supplier environment
- Makes it harder to differentiate as to who owns what data
- Contractual agreements made in such collaboration models typically tend towards Joint IP

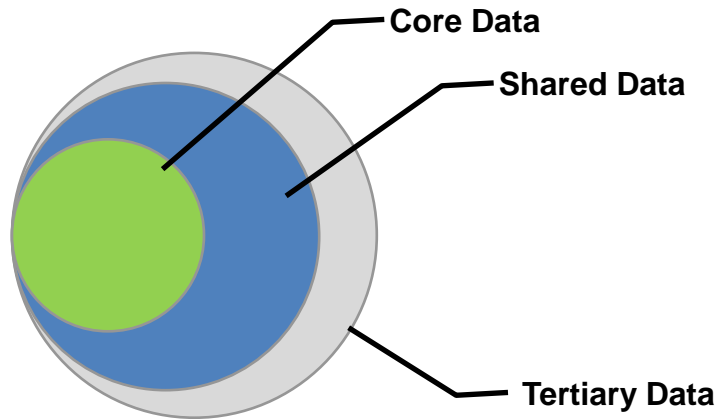
The System Integrator Challenge



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Nuanced view of Product Data

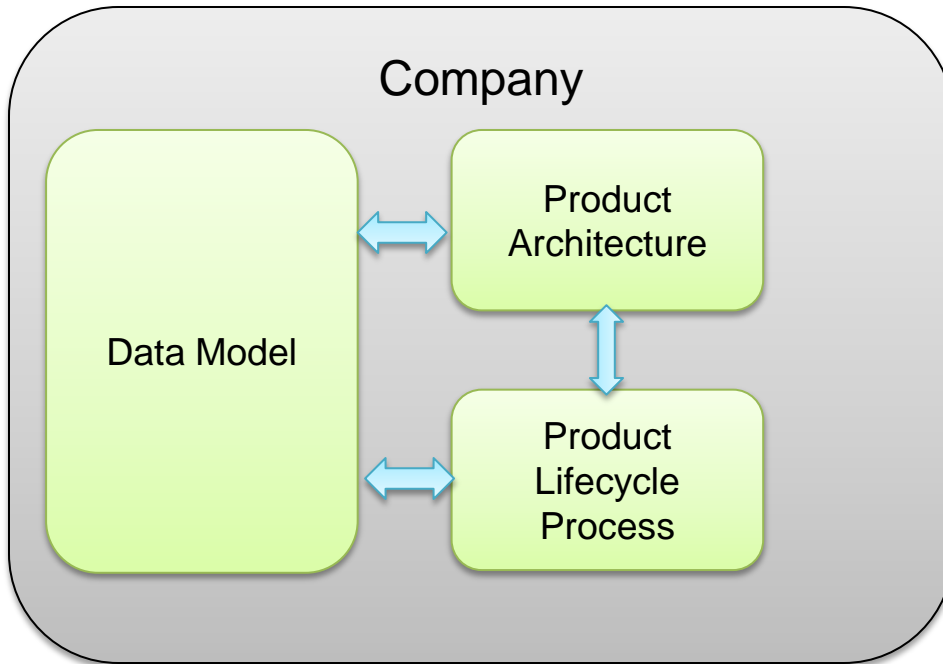
Tiers of Product Data



1. Core Data: Product Data which companies invest in developing and is crucial to business success. This data is often not shared with suppliers & partners.
2. Shared Data: Product Data for which the company is dependent on its suppliers & partners to build and wants to actively manage.
3. Tertiary Data: Product data created by partners & suppliers; company may use this information but do not want to actively manage it.

Objective: Build a nuanced view of Product Data in line with Collaboration Models

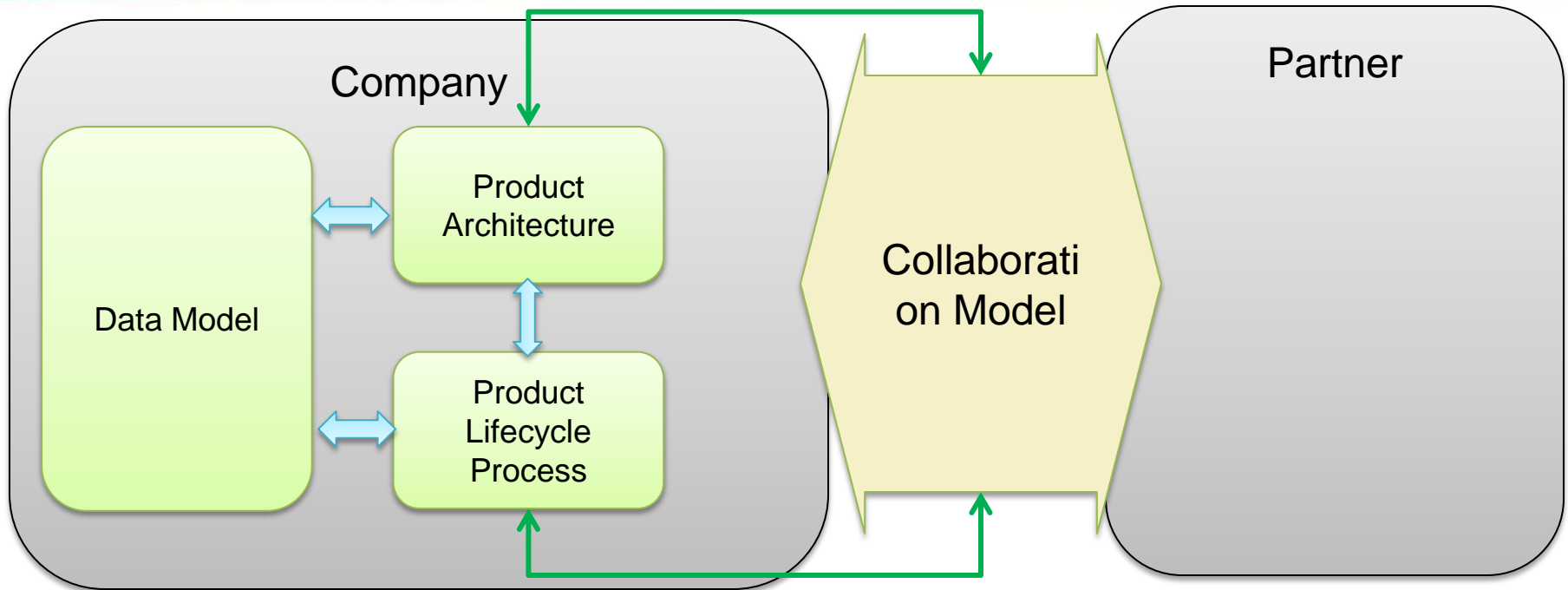
Proposed Approach: Align



Align

- Review the Product Data Model
- Align Data representation to Product Architecture & Lifecycle Processes

Proposed Approach: Adapt



Align

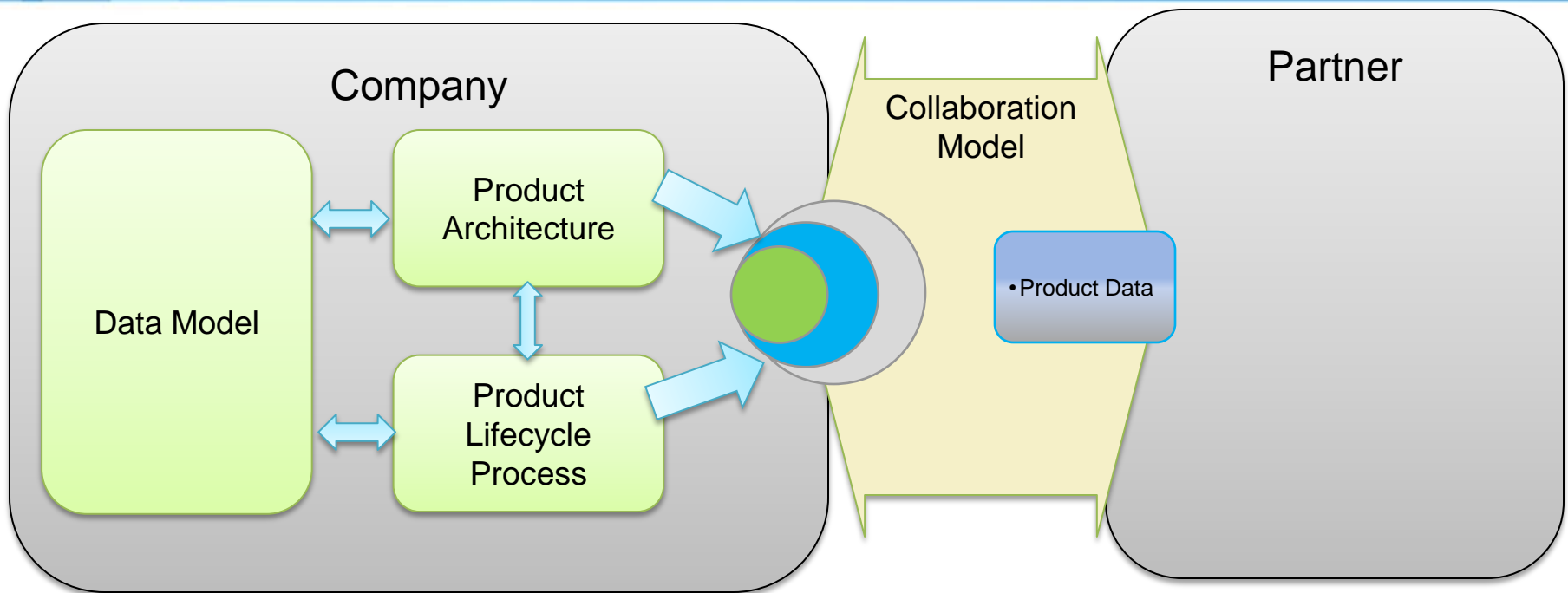
- Review the Product Data Model
- Align Data representation to Product Architecture & Lifecycle Processes

Adapt

- Adapt your Product Data Model based on effect of Collaboration Model on
 - Product Architecture
 - Lifecycle Processes

Adapt Product Data Model based on the Collaboration Model

Proposed Approach: Tier



Align

- Review the Product Data Model
- Align Data representation to Product Architecture & Lifecycle Processes

Adapt

- Adapt your Product Data Model based on effect of Collaboration Model on
 - Product Architecture
 - Lifecycle Processes

Tier

- Tier your Data to identify Core / Shareable Data for each Product, Product Lifecycle Process and Collaboration Model

Collaboration Model Driven Identification of Shareable Data with Partners

Summary

Align

- Review the Product Data Model
- Align Data representation to Product Architecture & Lifecycle Processes

Adapt

- Adapt your Product Data Model based on effect of Collaboration Model on
 - Product Architecture
 - Lifecycle Processes

Tier

- Tier your Data to identify Core / Shareable Data for each Product, Product Lifecycle Process and Collaboration Model

Governance Framework

- Data Exchange Standards should be established to enable this framework
- Data Package: Establish Data Distribution Packages to ensure consistency of shared data across suppliers, process and models
- Change Management : Changes in collaboration model, Product Types, Processes should be reviewed to ensure consistent collaboration
- Data Integration Points: Clearly establish Data Integration points in the processes

Authors

K. Balasubramanian

Global Head – PLM
TATA Consultancy Services
k1.balasubramanian@tcs.com

Nagraj Atlur

PLM Consultant – Automotive
TATA Consultancy Services – Europe
Nagraj.atlur@tcs.com

Kiran Kumble

PLM Consultant – Aerospace & Defense
TATA Consultancy Services
Kiran.kumble@tcs.com

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Thank You