



Innovative Supply Chain Practices: What Leading Aerospace and Industrials Are Implementing

4th Annual NASA Supply
Chain Quality Assurance
Conference

Deloitte Consulting LLP

October 20, 2010



Five Leading Practices

Practice # 1 Managing the Value Grid

Practice # 2 Developing Real Tier 1 Suppliers

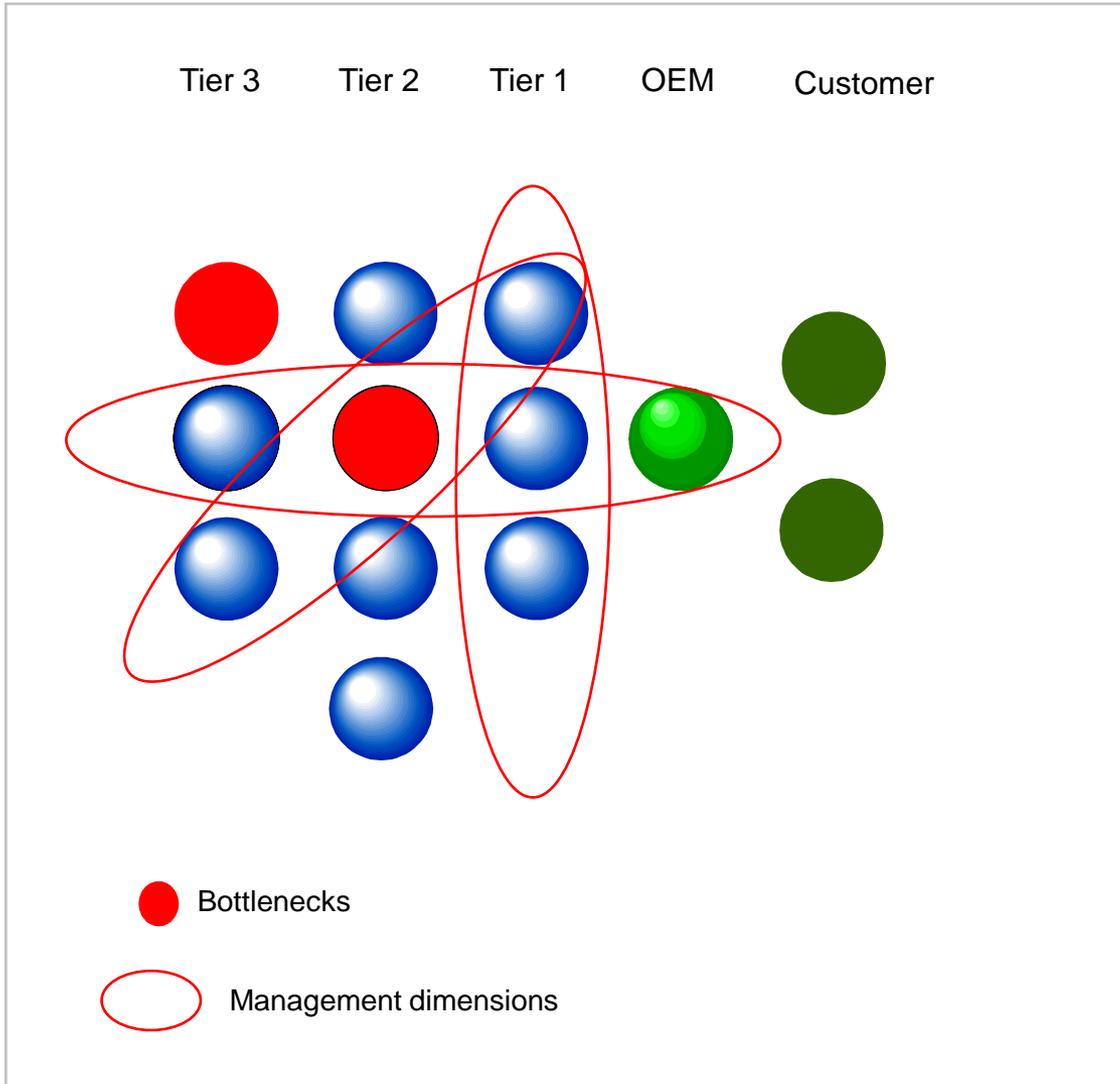
Practice # 3 Leveraging Systems Engineering in Development

Practice # 4 Accelerating Innovation in a Nonlinear World

Practice # 5 Creating Network Flexibility

Value Grid Management Has Multi-dimensional Opportunities for Collaboration and Improvement

Value Grid



Opportunities

Managing the Horizontal

- Minimizing demand variation/ schedule churn to increase network capacity and OTD performance
- Provide financing /tolling opportunities for weaker tier 1s

Managing the Vertical

- Adjust spend across the tier to free capacity and improve mix
- Manage Outside Service Providers for each tier for cycle time improvements
- Share test equipment and tooling

Managing the Diagonal

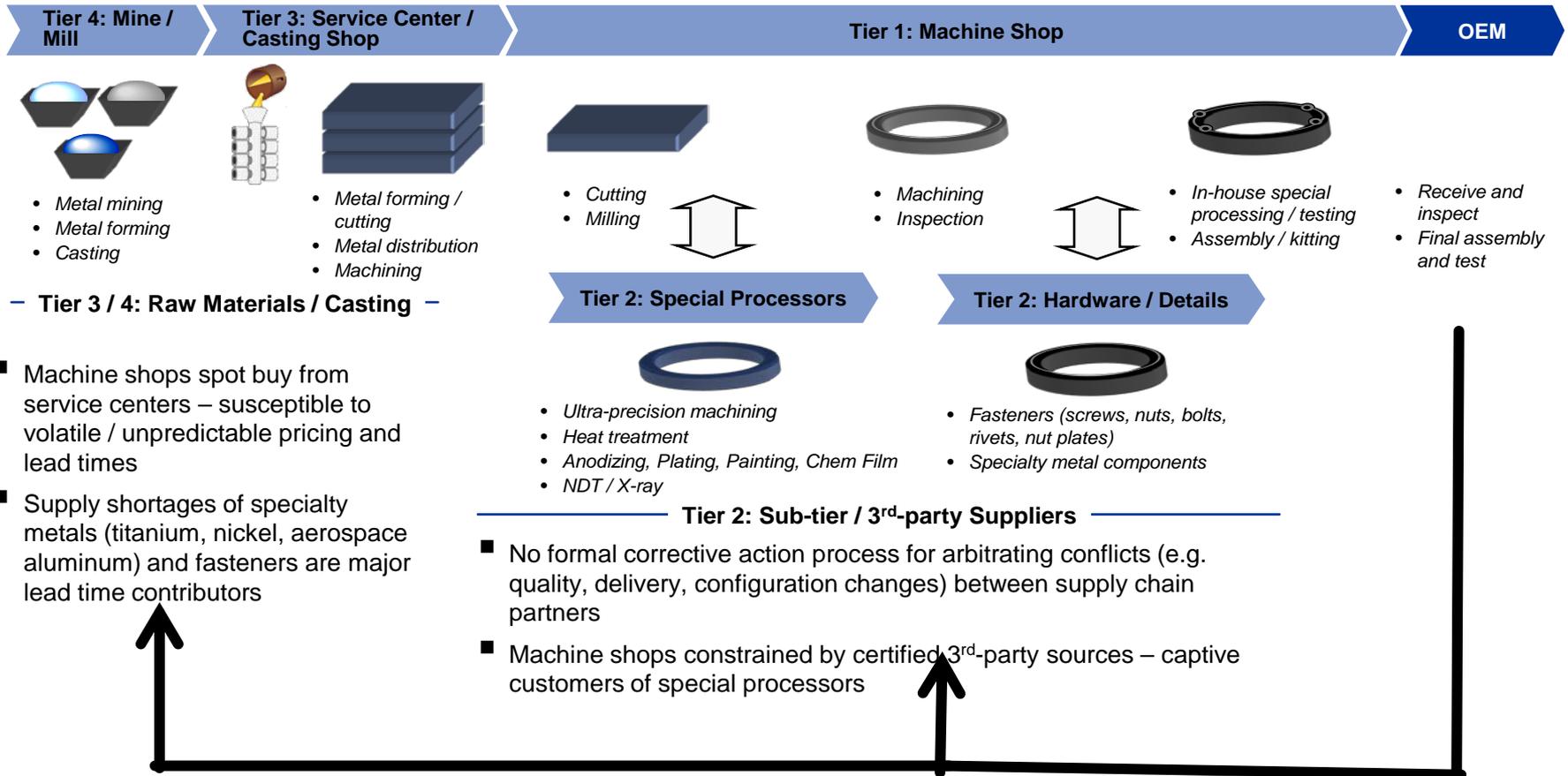
- Leverage raw materials across the grid
- Use of underutilized assets from adjacent players /create emergency response options

Managing the Bottlenecks

- Buy capacity options/employ hedging strategies
- Deploy Joint Process Improvement Teams/Shop assist

Going one level down in the supply chain isn't sufficient; problems often originate deep in the extended supply chain

Client Example – Precision Machining



OEM can leverage its size and gain its fair share of capacity and mind-share with large sub-tier suppliers, share forecasts and business plans, and create a special processing supplier pod for quick response processing

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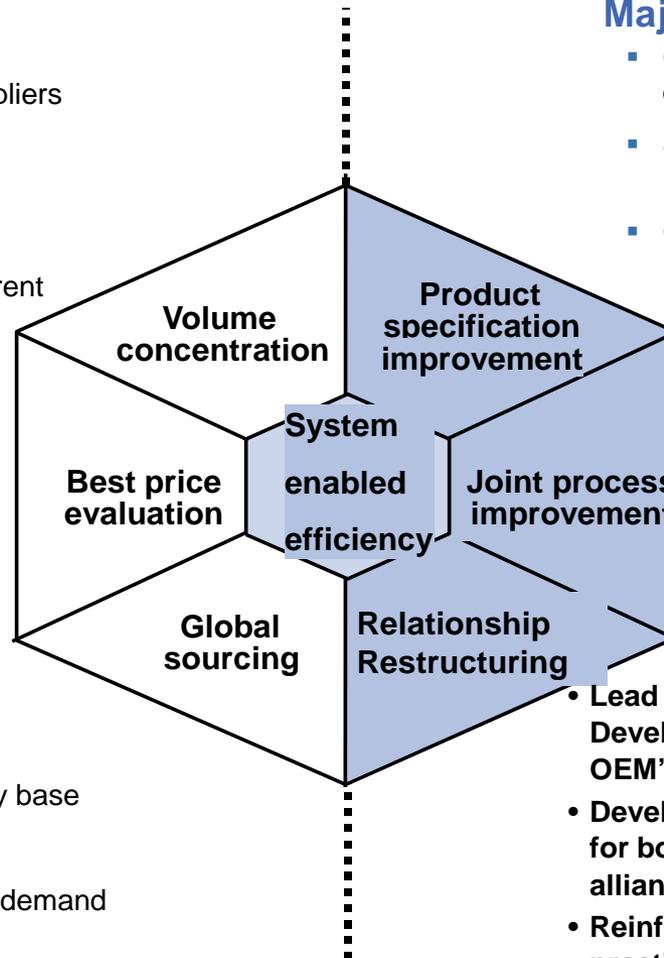
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Tier 1 ecosystem partners capabilities will need to evolve or they will become Tier 2/3 suppliers

Primary Focus of Commodities

- Consolidate number of suppliers
- Pool volume across sites
- Redistribute volume among suppliers
- Combine volume from different categories
- Compare “total” costs
- Model “should-costs”
- Renegotiate prices
- Unbundle pricing
- Expand geographic supply base
- Develop new suppliers
- Profit from global supply / demand imbalances



Primary Focus of Tier 1s and Major Subcontractors

- Conduct product value analysis and engineering
- Standardize parts and Substitute materials
- Optimize life cycle costs
 - Reengineer joint processes
 - Share productivity gains
 - Integrate logistics
 - Support supplier operations improvement
 - Vendor Managed Inventory
 - Examine strategic make versus buy
- Lead integrated Product Engineering & Development teams as a key member of the OEM’s system of systems team
- Develop Product Lifecycle Aftermarket Services for both own products and those of 3rd party alliance partners
- Reinforce robust Commercial Management practices such as value based pricing and risk sharing
- Develop & deploy Collaborative Infrastructures to facilitate virtual project working across geographies, customers and supply partners

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The Supply Chain Leverage Index incorporates systems engineering, design and supply chain capabilities early in a staged-gate review

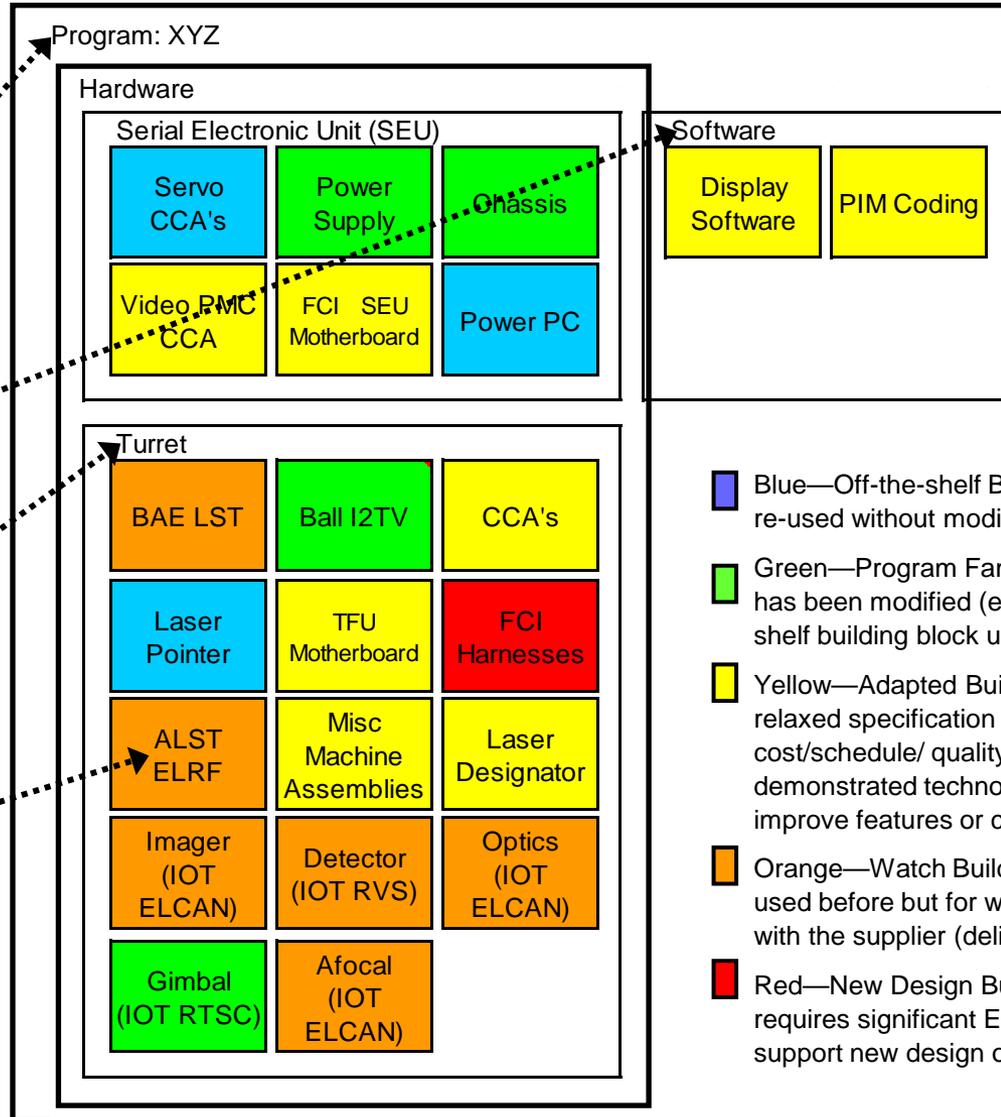
Example of the SCLI framework applied to a Program

System (Program Level)

Module (IPTs)

Sub-systems

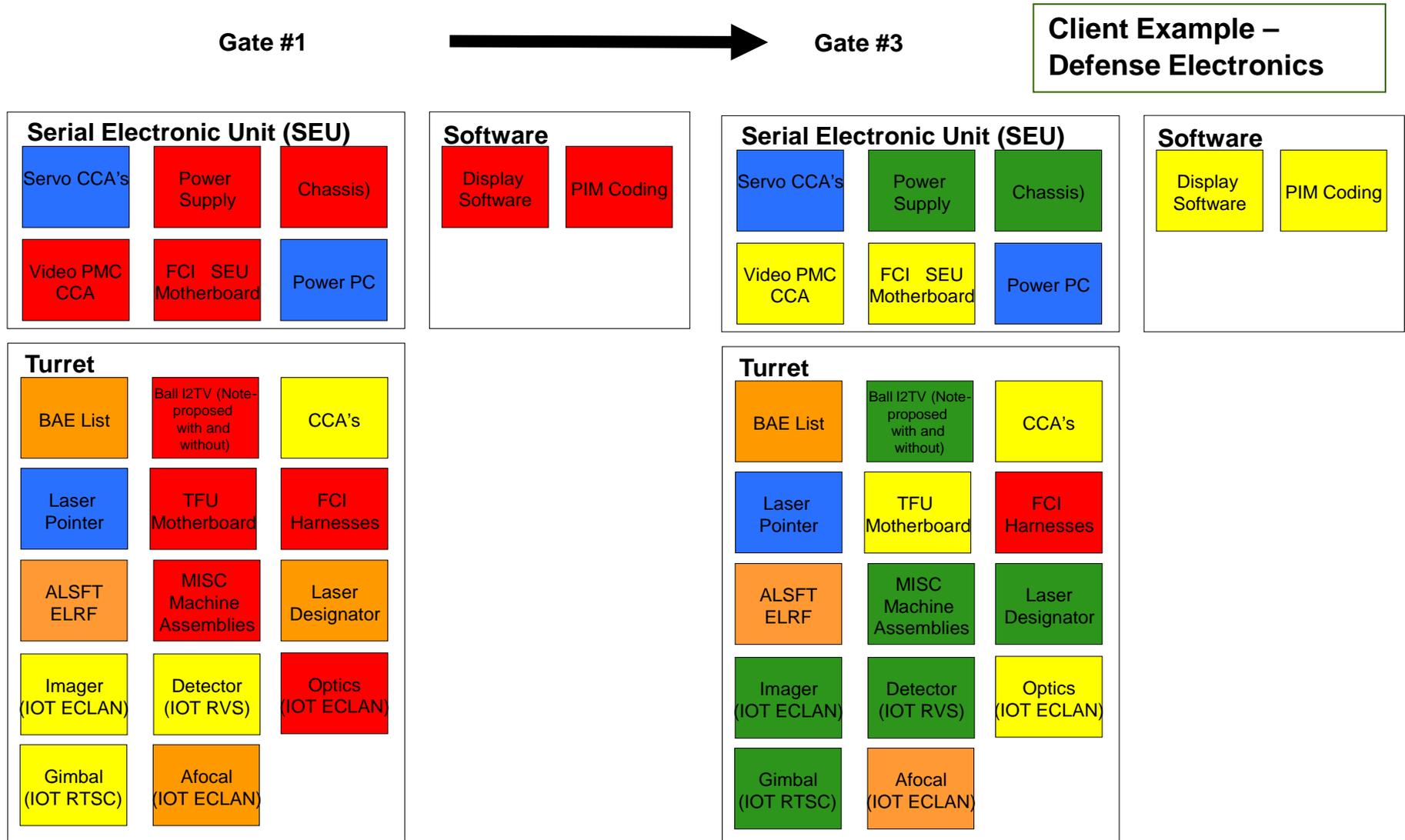
Building blocks



Color Code

- Blue—Off-the-shelf Building Block: Building block that can be re-used without modification from superior supplier
- Green—Program Family Building Block: Building block that has been modified (e.g., morphed or scaled) from an off-the-shelf building block using common supplier
- Yellow—Adapted Building Block: Design incorporating relaxed specification with new supplier to improve cost/schedule/ quality performance or new design using demonstrated technology with existing core supplier to improve features or capabilities
- Orange—Watch Building Block: Building Block that has been used before but for which there are significant open issues with the supplier (delivery or quality performance).
- Red—New Design Building Block: Building block that requires significant Engineering or Supply Chain effort to support new design or qualify supplier

As a program manager which of these designs will keep you up at night?



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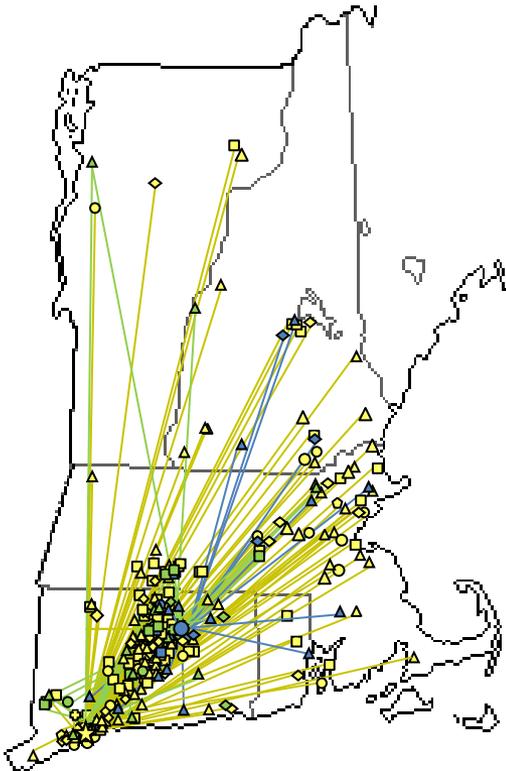
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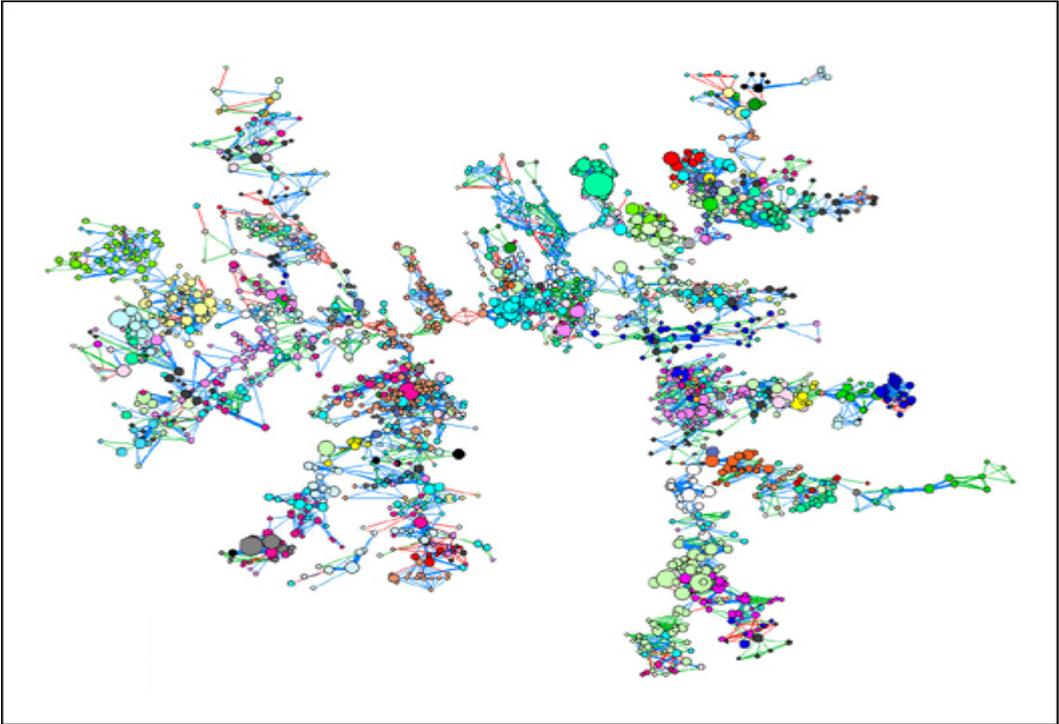
R&D is a non-linear network game whose value increases with the number of participants—it is not a simple pipeline

New England Aerospace Network of 254 companies



Tier 1	Tier 2	Tier 3	OSP	Logistics
15%	44%	10%	29%	2%

Network of New England Inventors



Legend

Node/Color: Inventor /Org

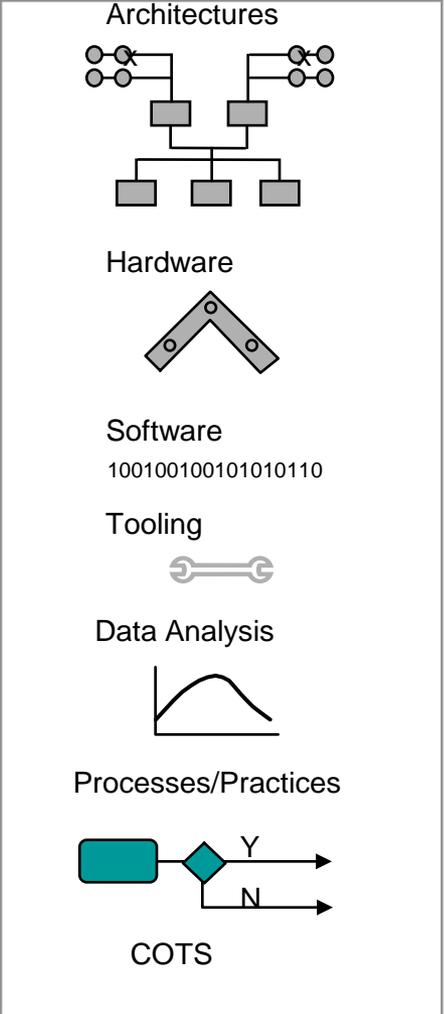
Size of Node: Importance of Invention

Link: Collaboration Tie

Source: © 2004 HBS associate professor Lee Fleming; United Technologies; Deloitte Analysis

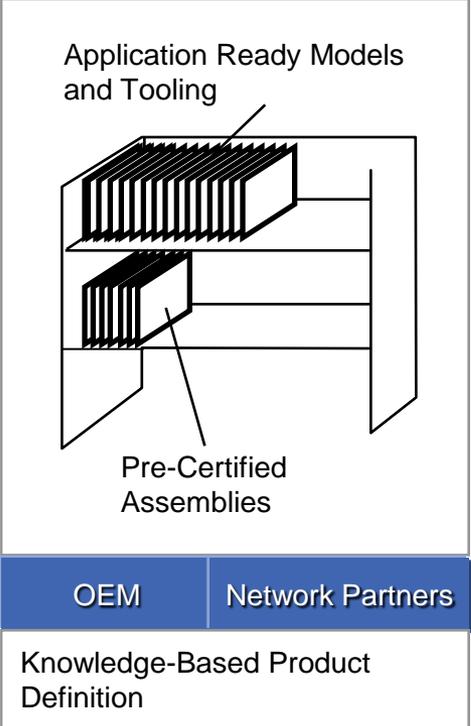
Integrative networks can combine reuse libraries, technology bookshelves and knowledge-based product definitions for fast creation

Reuse Knowledge Management



+

Technology "Bookshelf" Investment



Network Knowledge/
Lessons Learned



High Velocity/LEAN Creation Process

- Conceptual Design
- Generic Configurations
- Final Configuration
- Phase-Gated Process
- Design and Development Process

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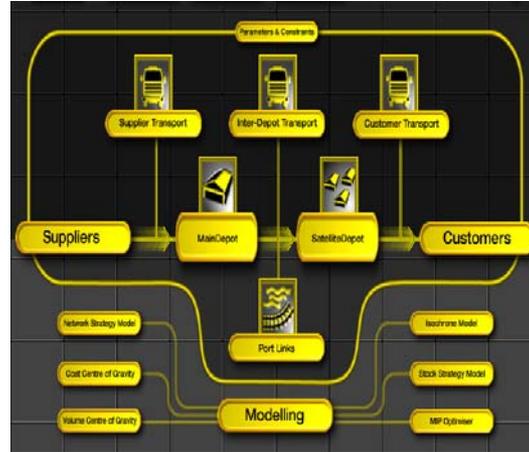
Leading Manufacturers are optimizing their footprint and network flexibility

Firms are optimizing their manufacturing and logistics footprint....

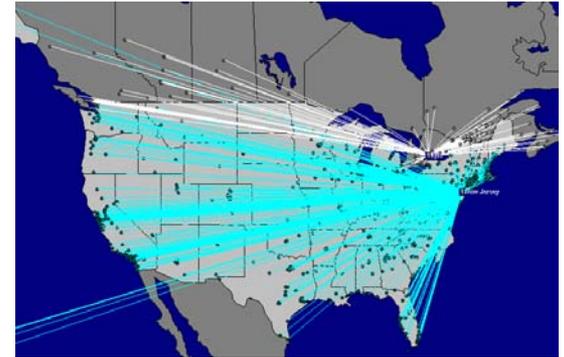
As Is Supply Chain



CASTdpm / LogicTools



To be Supply Chain



.... While enhancing their flexibility

Currency Hedge

Low Cost Labor

Low Cost Supply Chain/Sourcing

Capacity and Planned Redundancy

Cycle Time/lead Time Reduction

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