

A Multi- Dimensional Framework for Lean Transformations



Lean Software Institute

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September 21, 2009

About the Lean Software Institute



Vision

To be a leading Lean resource for the companies providing software-intensive products and services.

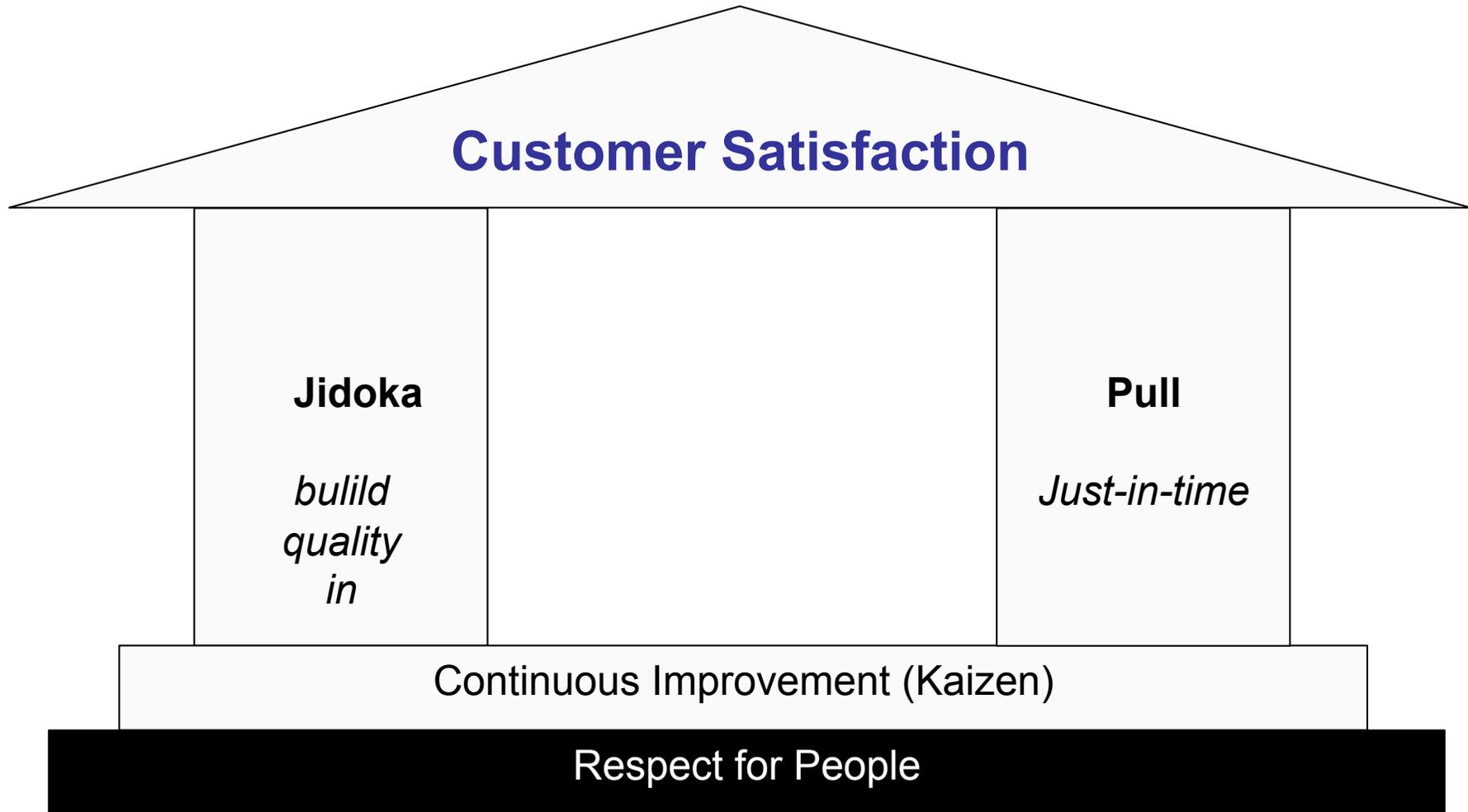
Mission

Help our clients accelerate profitable growth through the implementation of Lean principles and practices.

So what IS Lean, really?

- Methodology for organizational learning
- Originated at Toyota 40+ years ago
- Lean = less lead time, cost, defects, ...
- Mobilize entire organization for innovation
- Responsible for Toyota's success
 - Passing GM, becoming #1 automaker
 - 4 x Product Development Efficiency
 - 2-3 x Faster to Market

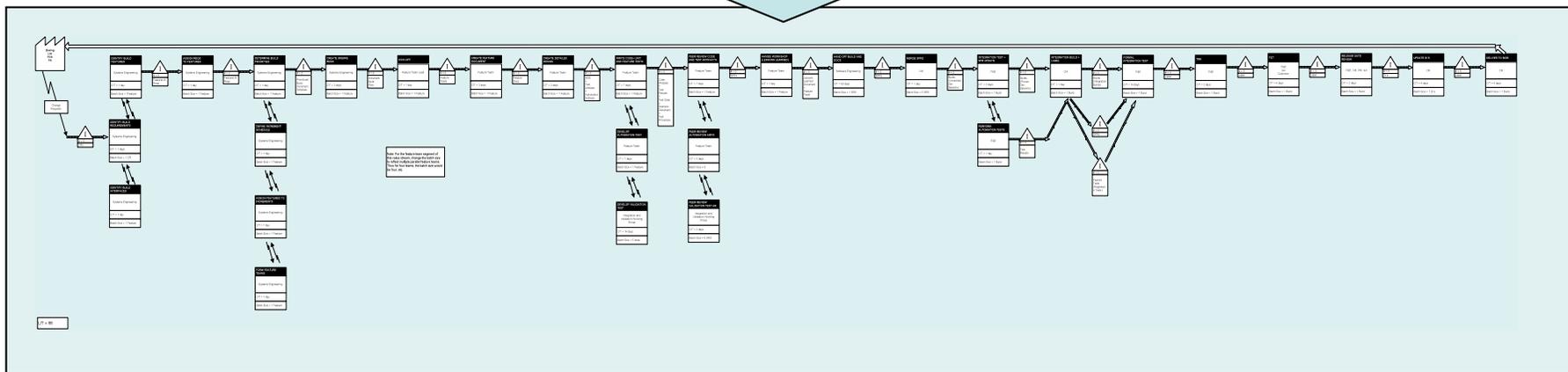
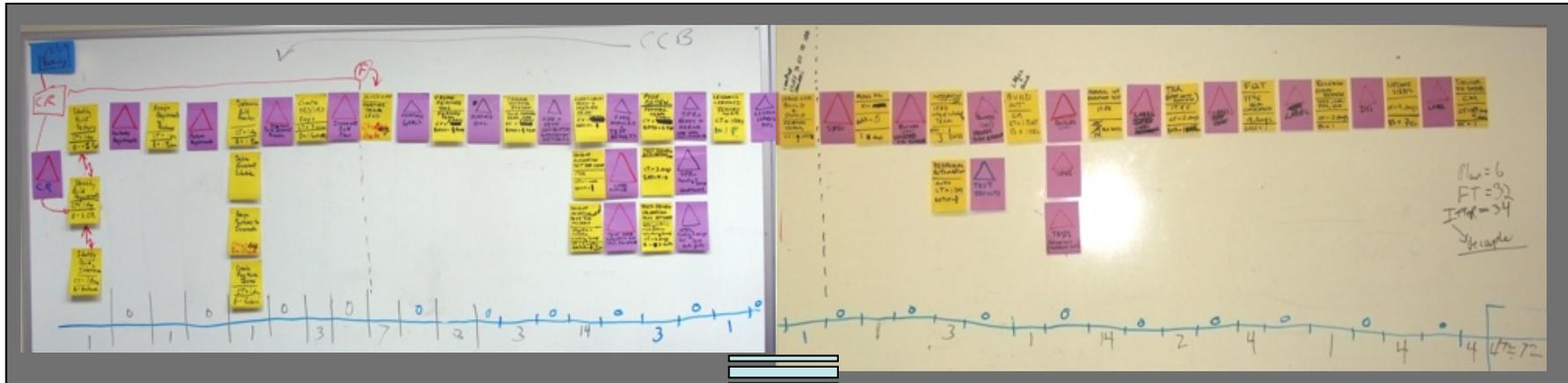
The house that Toyota built



Five Lean Principles

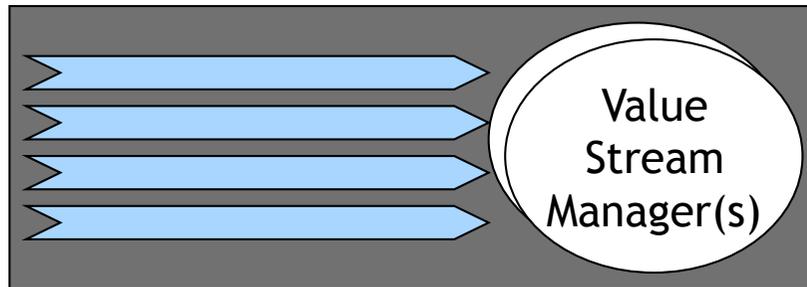
1. **Define Value:** Understand what actually creates value for the customer.
2. **Identify Value Streams:** Understand how the organization creates customer value
3. **Improve Flow:** Maximize the speed and cost-efficiency of your value streams by achieving continuous flow
4. **Pull:** Deliver value on a just-in-time basis based on actual customer demand
5. **Pursue Perfection:** Continuously and aggressively improve the performance of your value streams

Mapping Value Streams

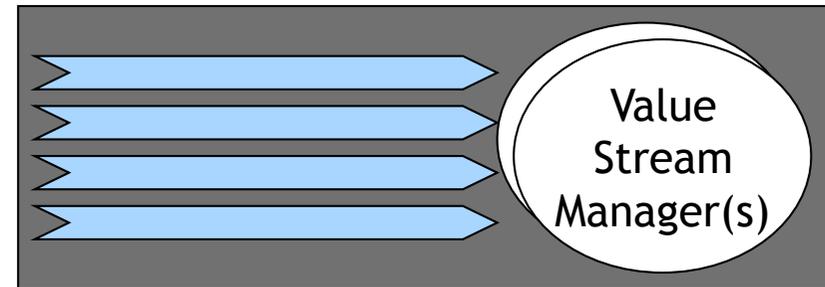


You are your value streams

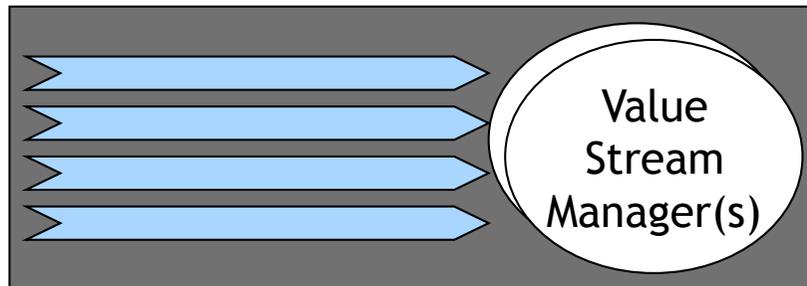
Product Development



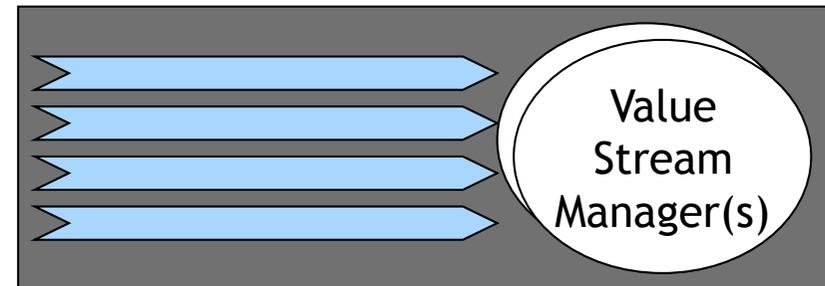
Service Delivery, Support



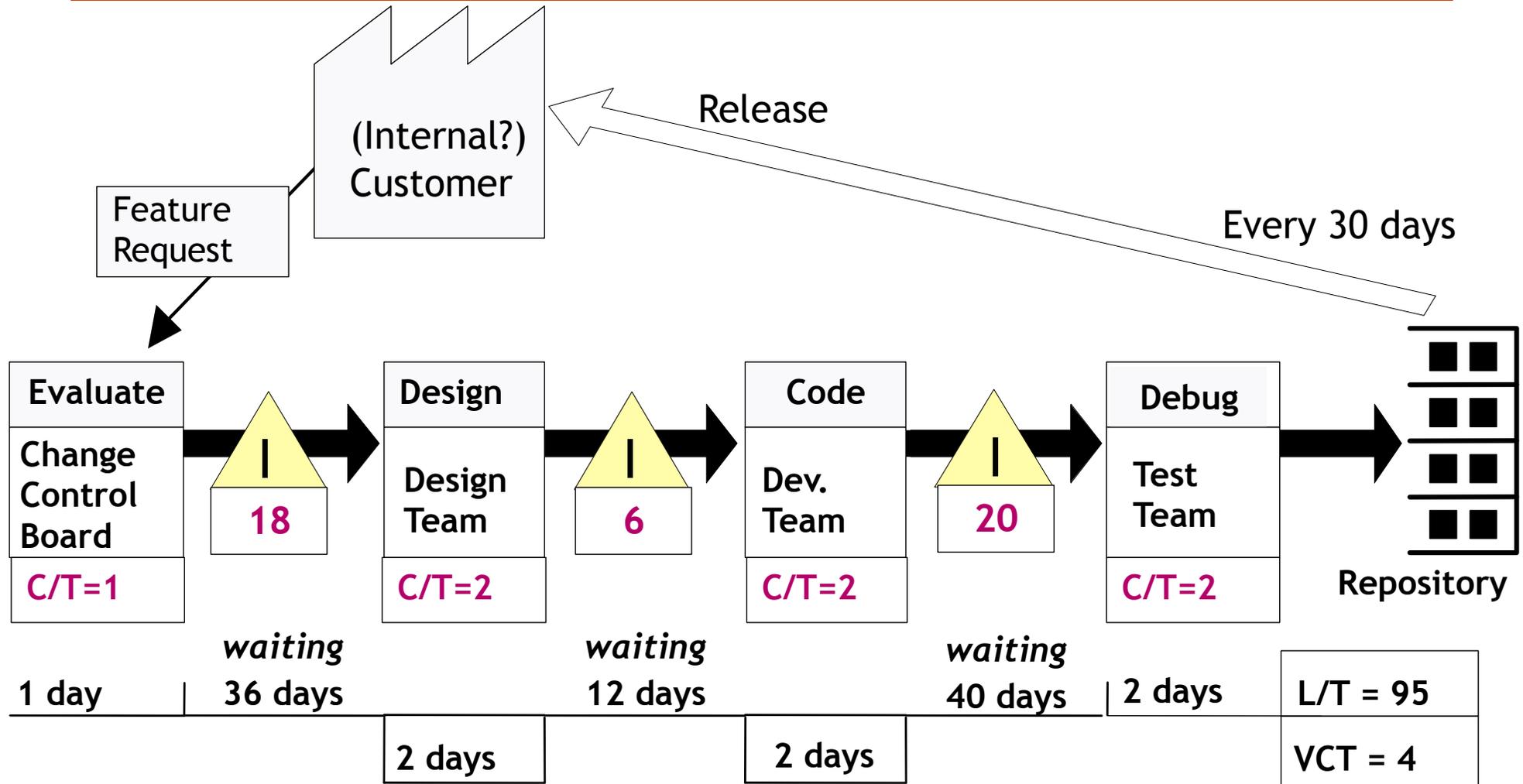
Lead generation, Sales



Finance, HR

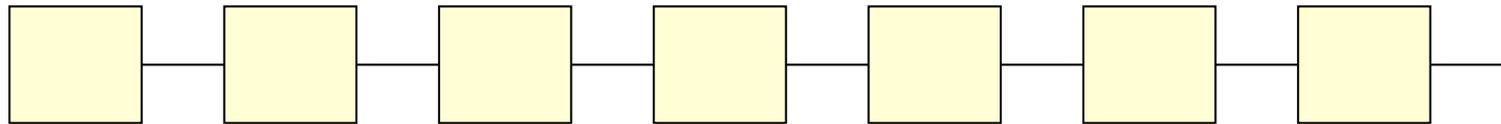


How value streams work



L/T: Lead Time for new feature, VCT: Value Creating Time, C/T: Cycle Time

What is the perfect value stream?

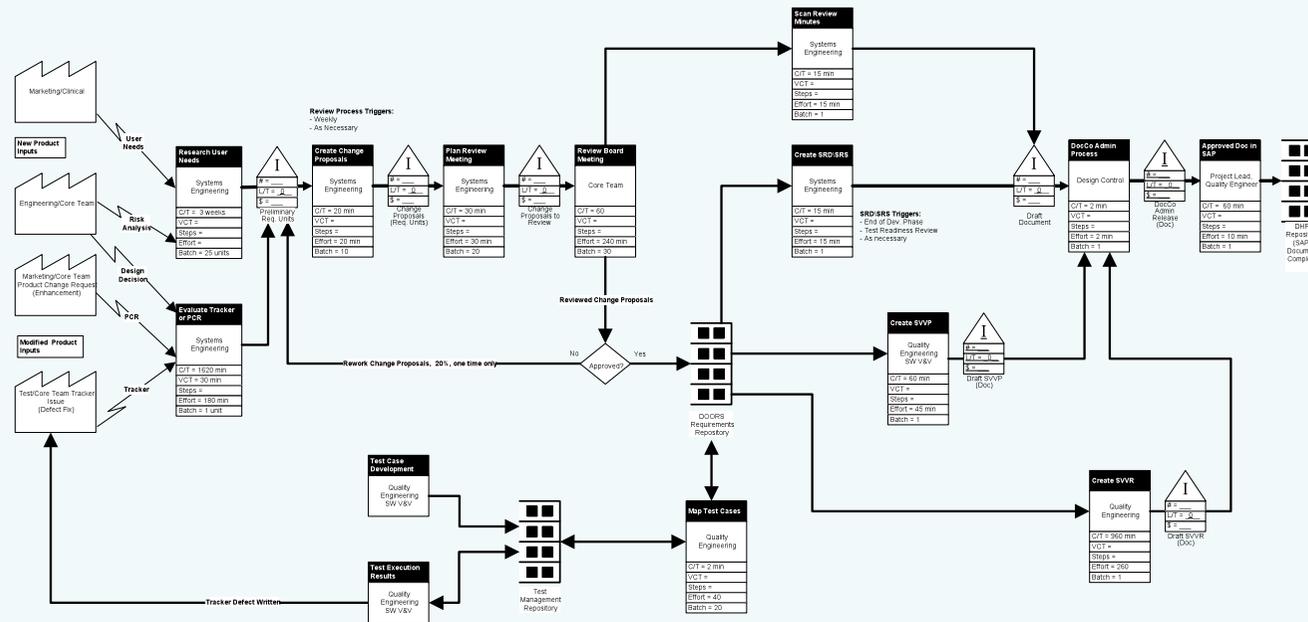


Each step should be:

- **Valuable** - must add customer value
- **Capable** - should not inject defects
- **Available** - must ready when we need it
- **Adequate** - keep up with demand
- **Flexible** - adaptable to changing demand

No waiting between steps!

Simplified requirements update process

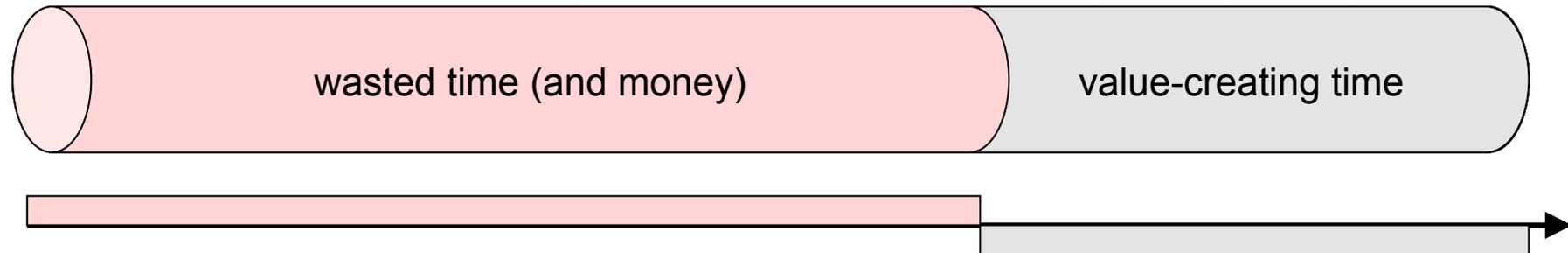


Lead time reduction:

New requirements: 64% reduction

Minor changes: 98% reduction

Improving flow



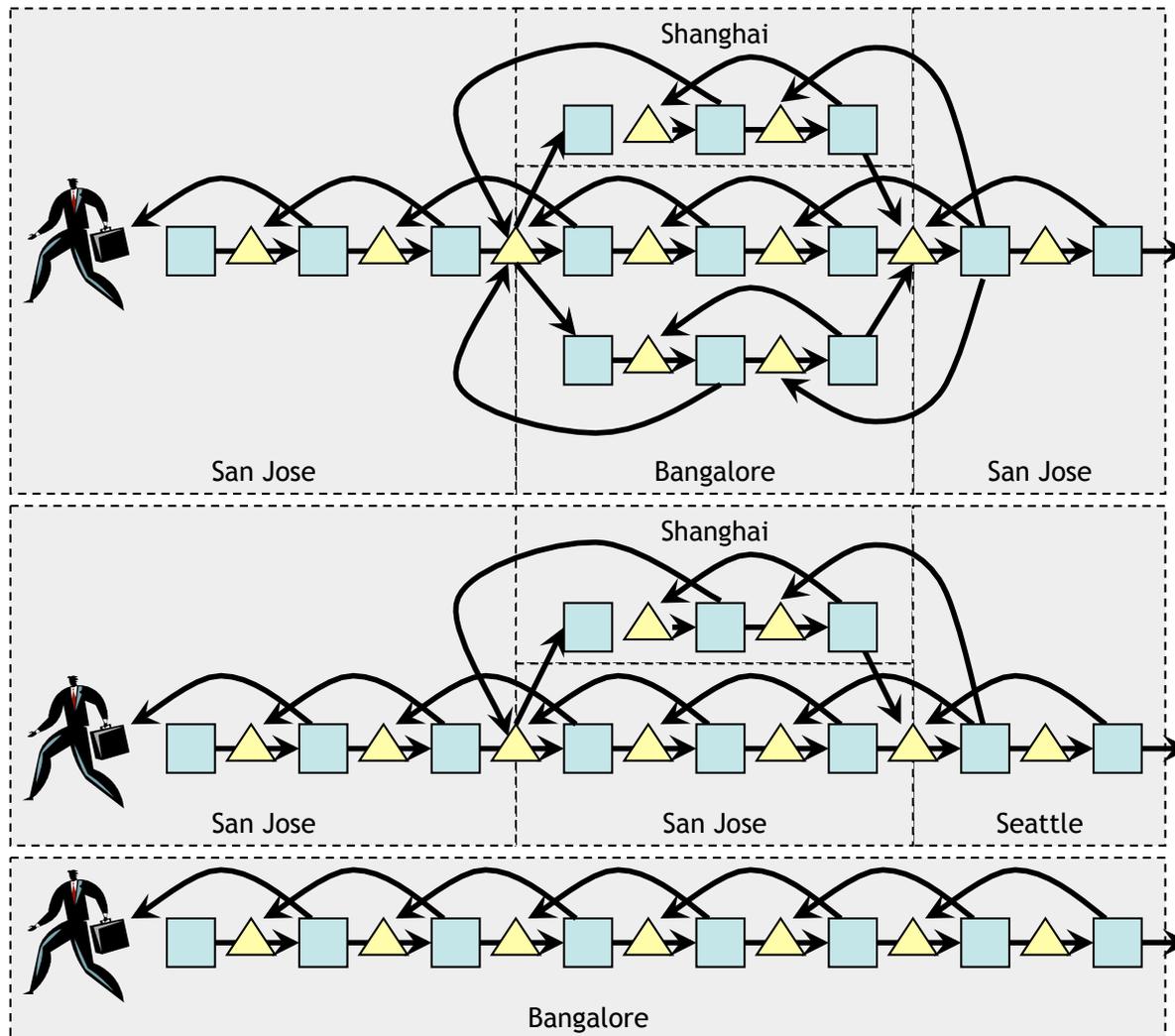
Flow inhibitors:

- Waiting (often due to Inventory, Big Iterations)
- Poor Specs → Missing/Wrong/Extra Information
- Product Complexity
- Defects & Rework (>50% of effort...)
- Unproductive Meetings
- Paperwork, Wasteful Steps
- Organizational/Team Structure, incl. Seating!
- ...

Sample Remedies:

- Synchronize, smaller cycles
- Redesign Info. Architecture
- Filter out NVA design
- Defect Prevention Process
- Eliminate/clarify purpose
- Simplify/eliminate
- Collaborative workspaces
- ...

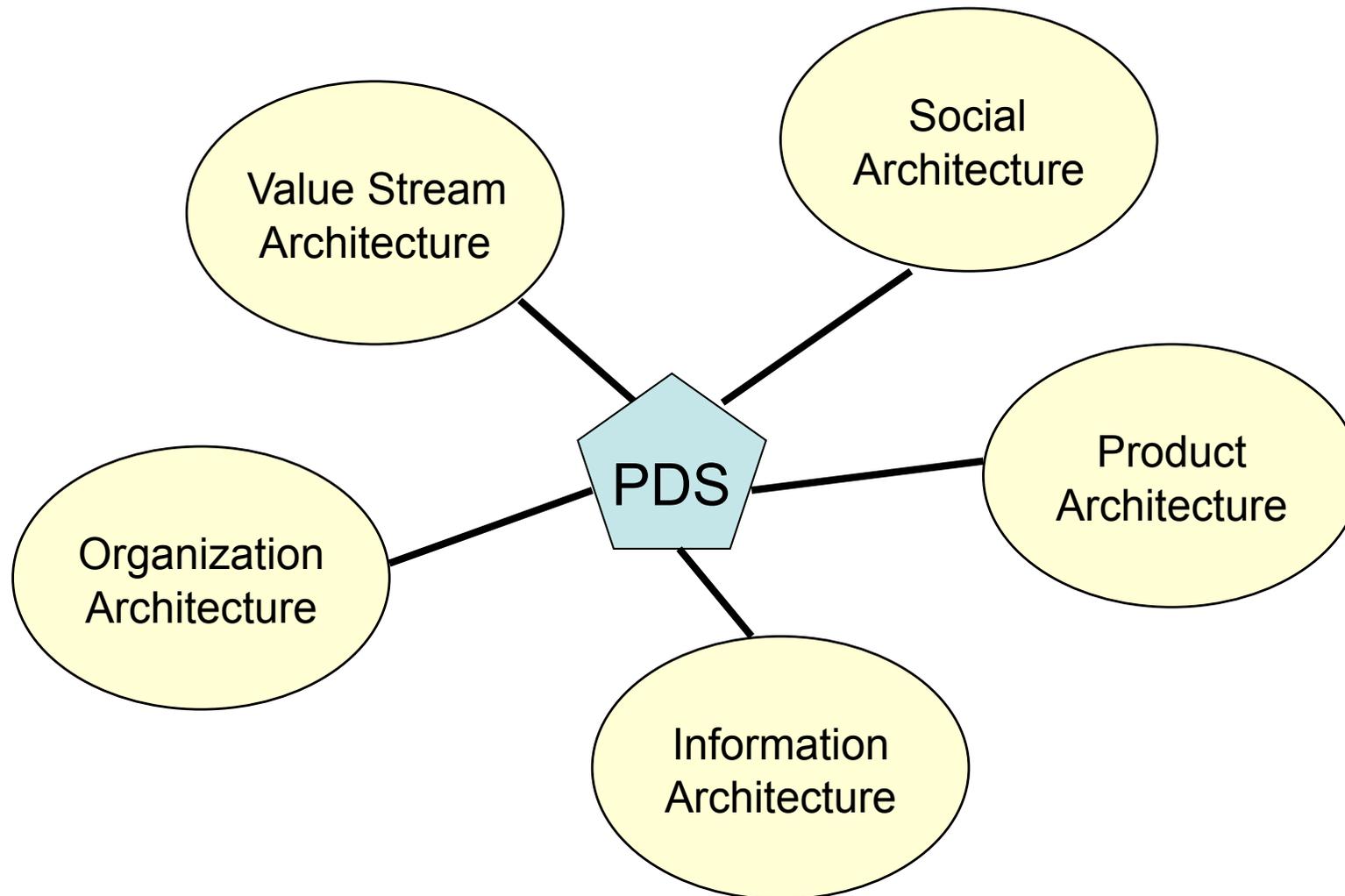
Value streams can get very complex..



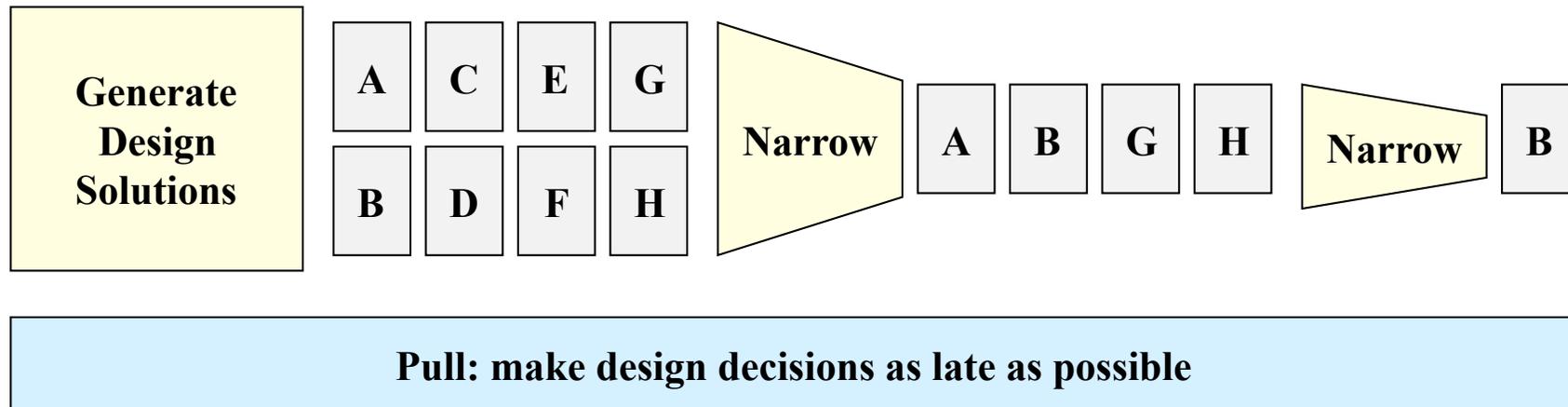
Business Systems



Product Development Systems



Toyota's Value Stream Architecture for New Product Development



Advantages:

- Learning-focused, not administration-focused
- More design ideas generated
- Better designs: objective selection using quantification and tests
- Improved engineering skills
- More knowledge/component re-use
- 2-3 x faster development

What is Information Architecture?

The **Information Architecture** of a product development system consists of the complete set of information artifacts for all products, processes, resources, and programs, together with the relationships between those artifacts.

Types of specifications

Evaluative - used to make decisions:

- Rules
- Checklists
- Comparison tables
- Tradeoff curves

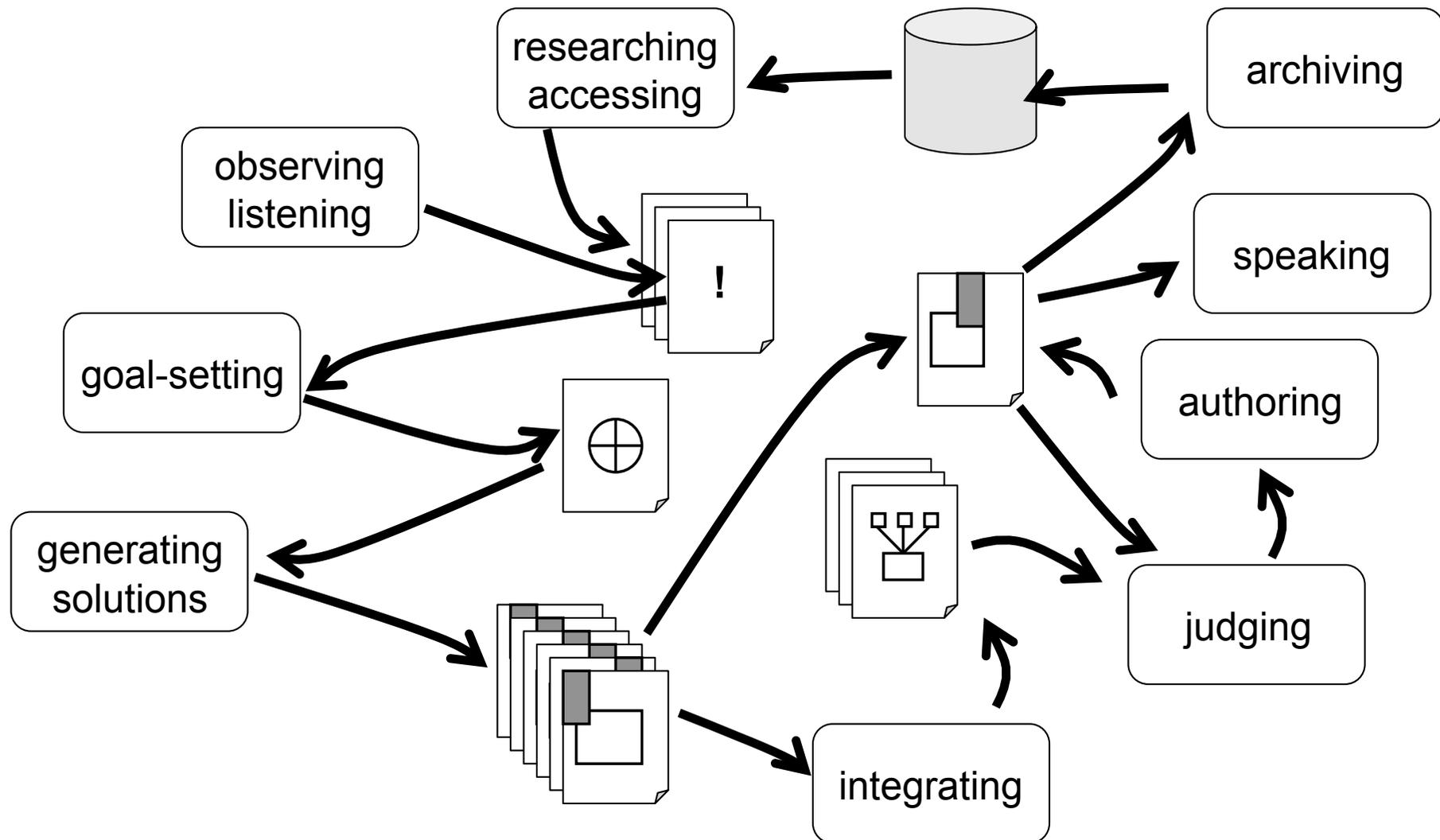
Prescriptive - used to specify goals and constraints:

- Process goals
- Product requirements
- Interface specifications
- Protocols

Descriptive - used to specify actual/candidate solutions:

- User interfaces
- Architecture designs (multiple views), component designs (multiple views)
- Source code, HDL code, circuit diagrams, mechanical design drawings
- Process and value stream descriptions

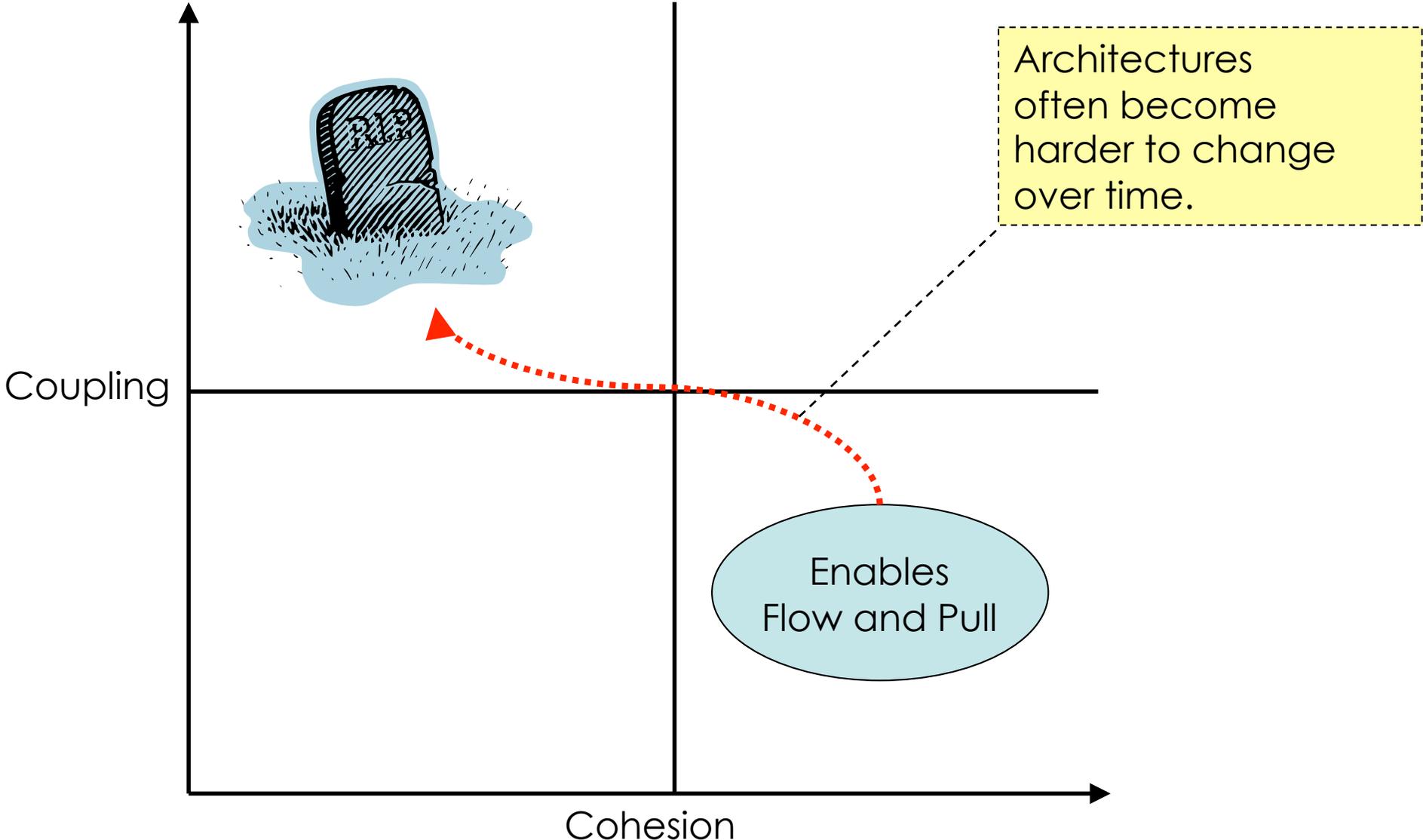
The cognitive roles of specifications



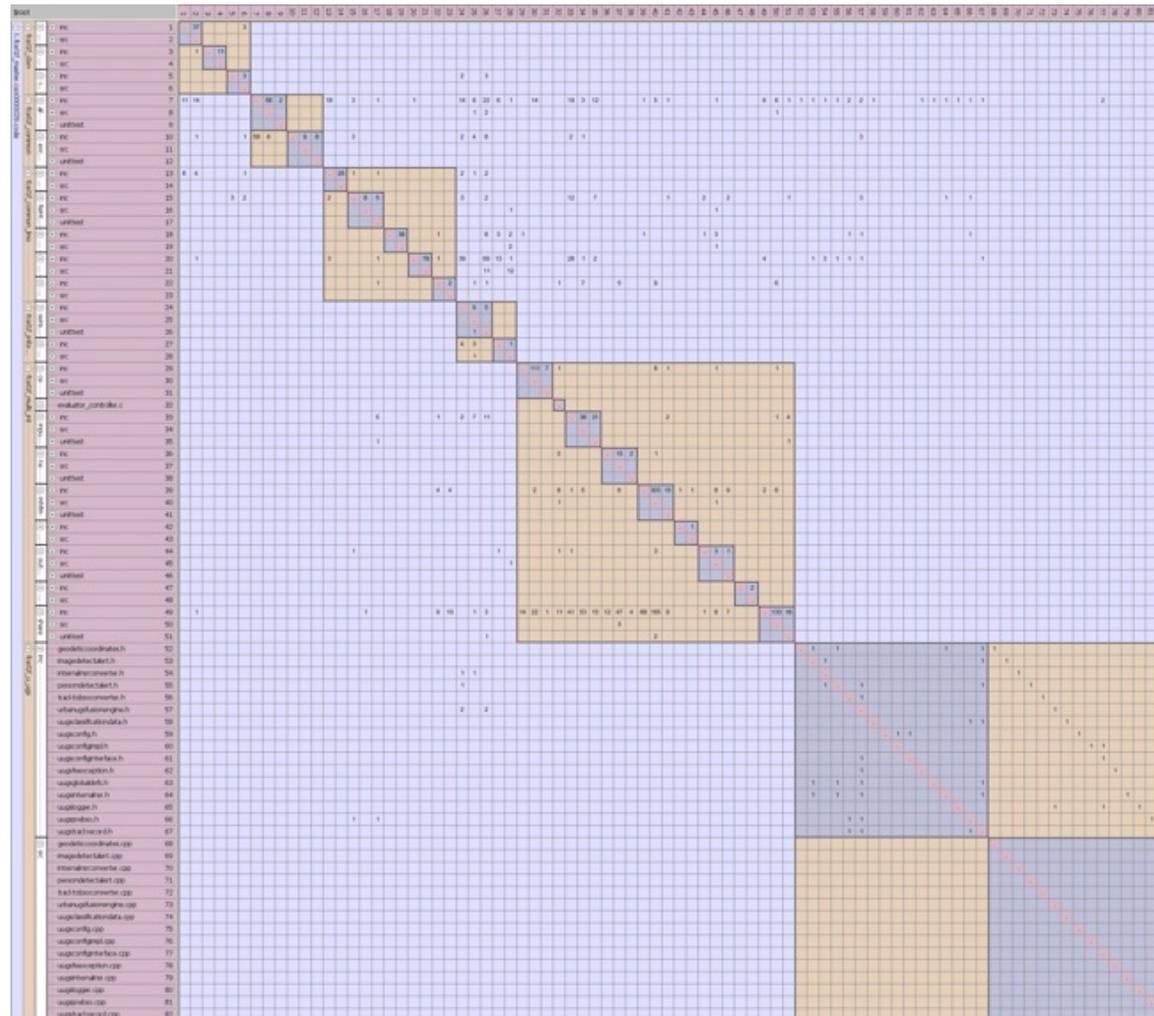
Benefits of an effective I.A.

- **Reduced Lead Time, Cost Savings**
 - Improved flow (process cycle efficiency), since many flow obstacles are due to Information Architecture problems
- **Accelerated Learning**
 - Clearly specified, quantitative goals
 - Design solutions that are better understood
 - Faster and more effective decision-making
 - Faster problem-solving
- **Helps other initiatives to improve product development performance**
 - More effective defect prevention and detection
 - Reduced rework effort and cost
 - Easier to harvest lessons from past work
 - Faster knowledge transfer

Product Architecture

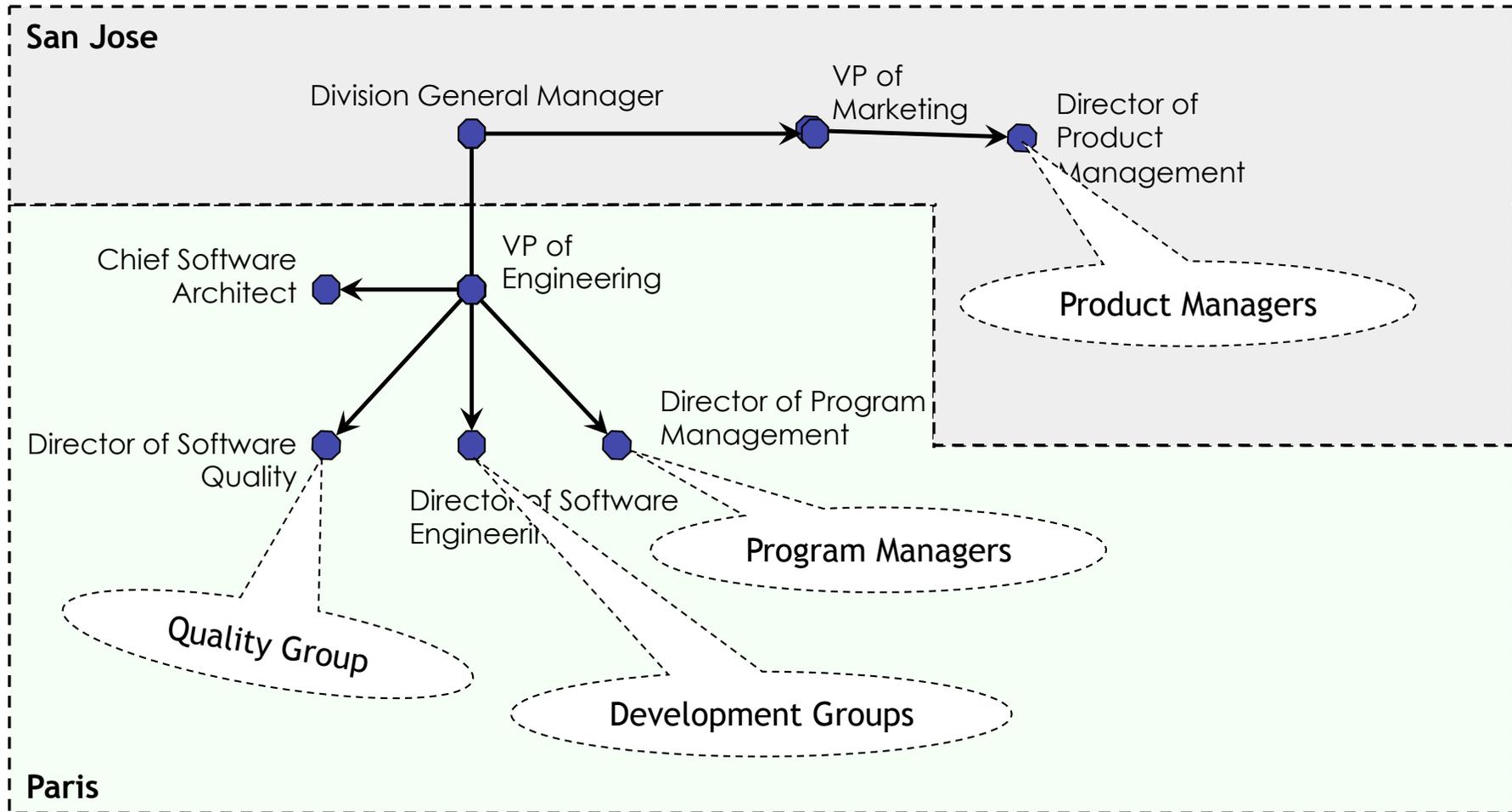


Design Structure Matrix (DSM)

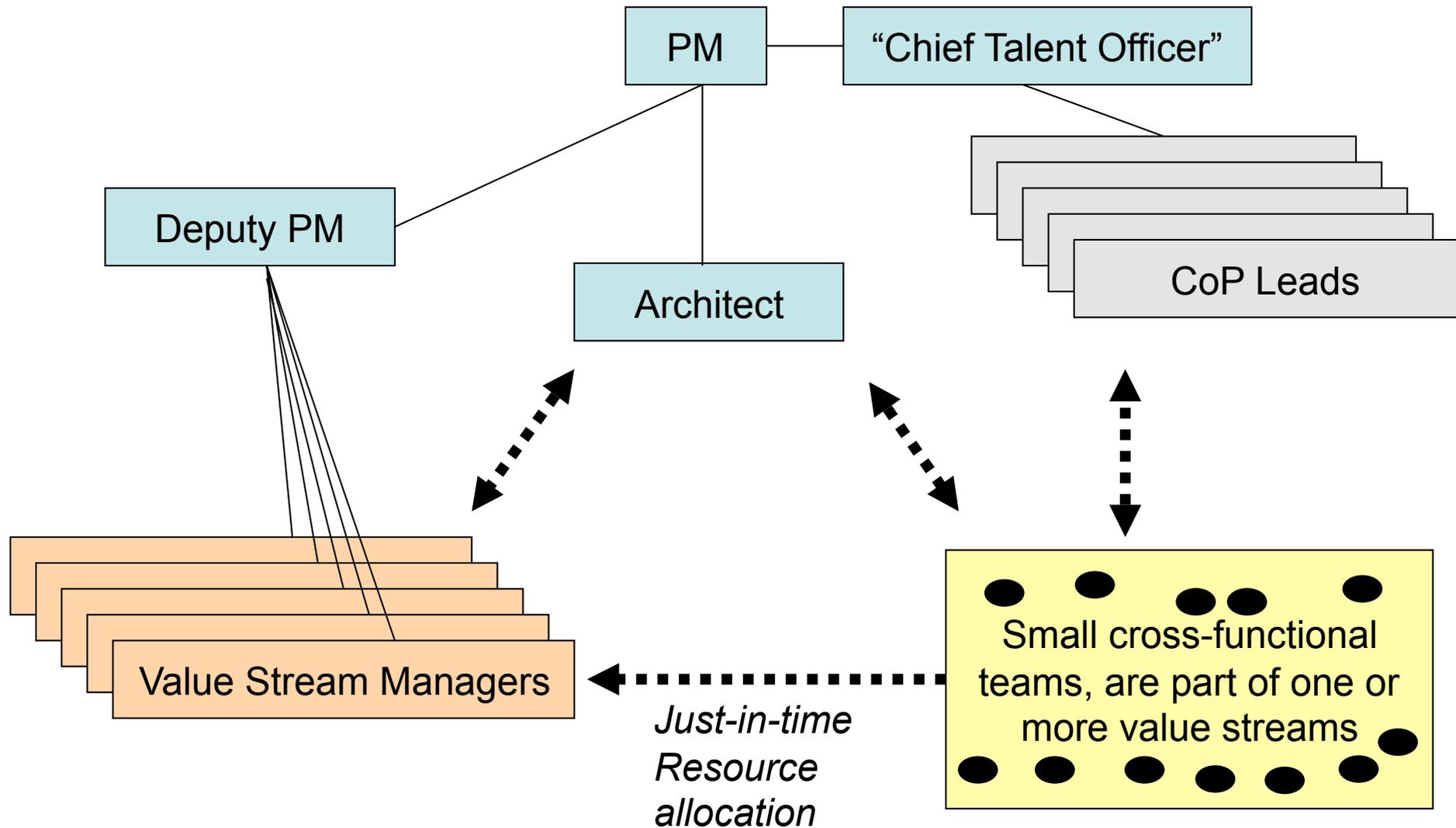


For more information about DSM, see <http://www.dsmweb.org>

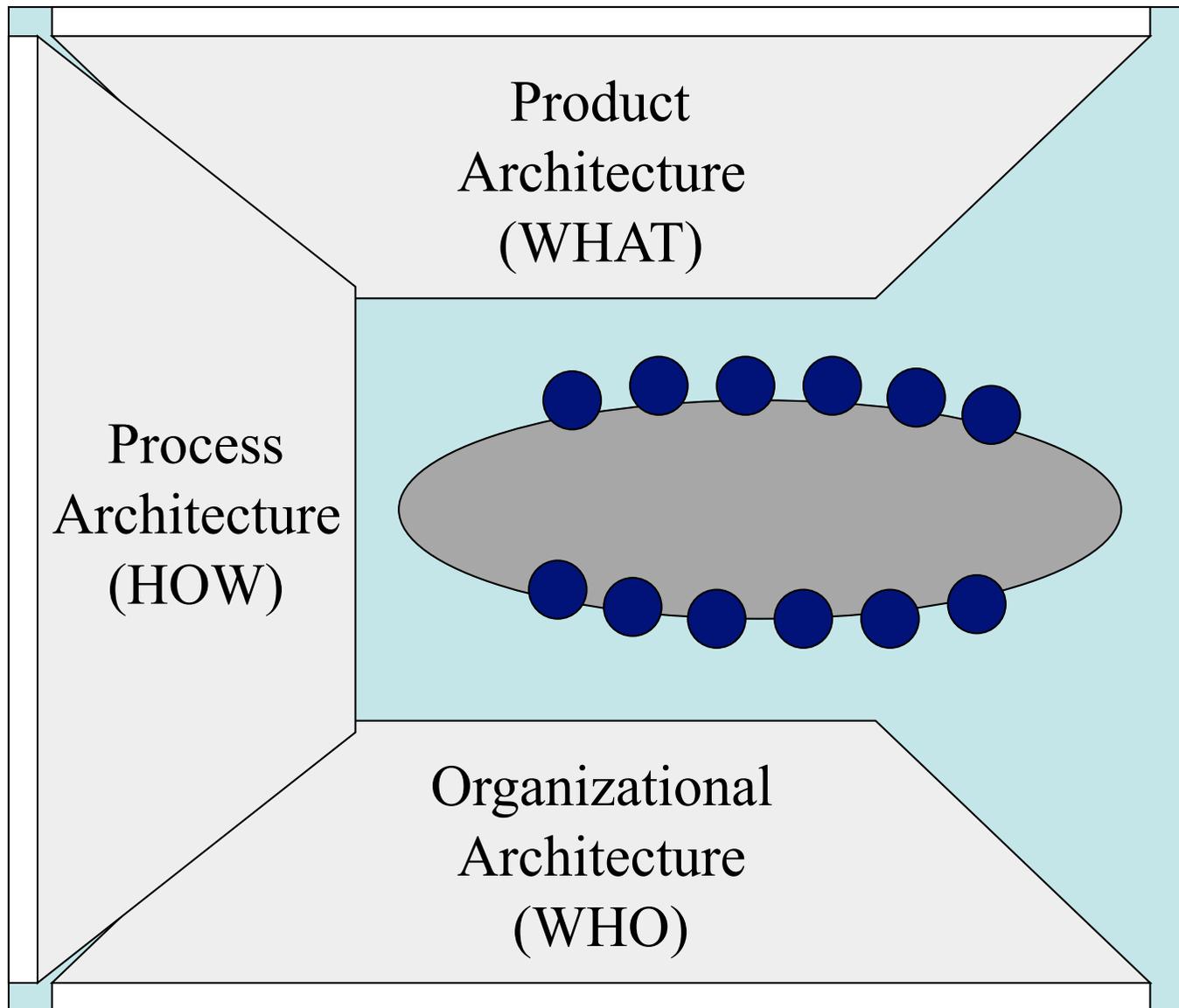
Organization Architecture



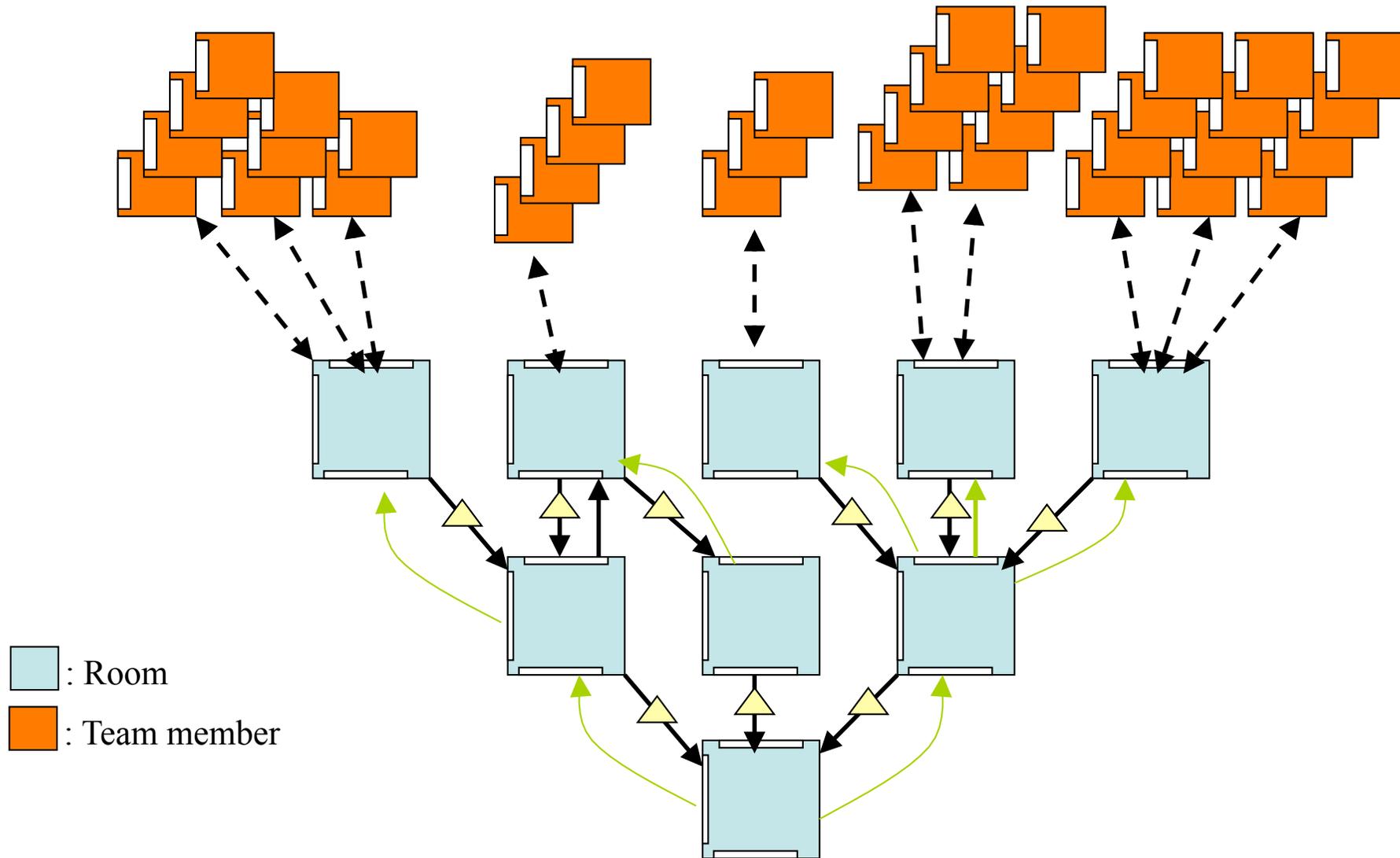
Sample Organizational Format Redesign



Obeya - “War Rooms”



Hierarchies of physical spaces

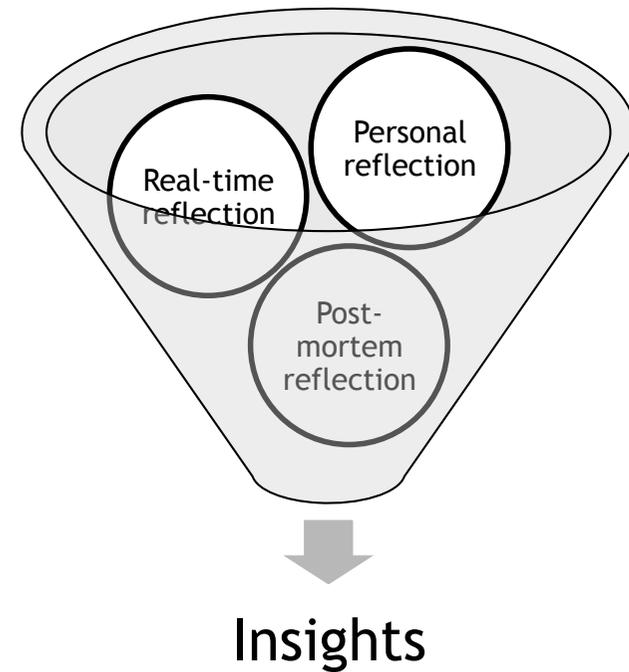
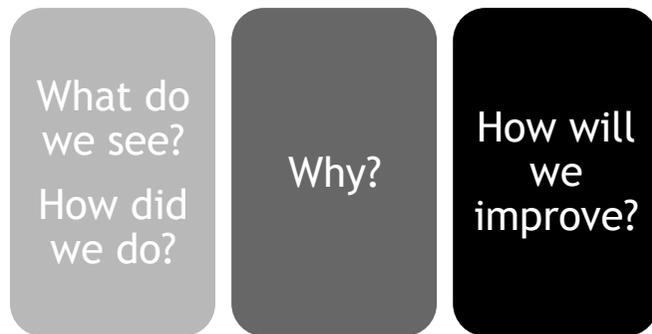


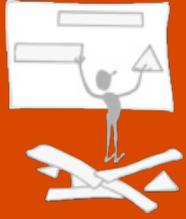
Social Architecture

HOW & WHAT WE THINK → HOW WE FEEL
→ HOW WE ACT

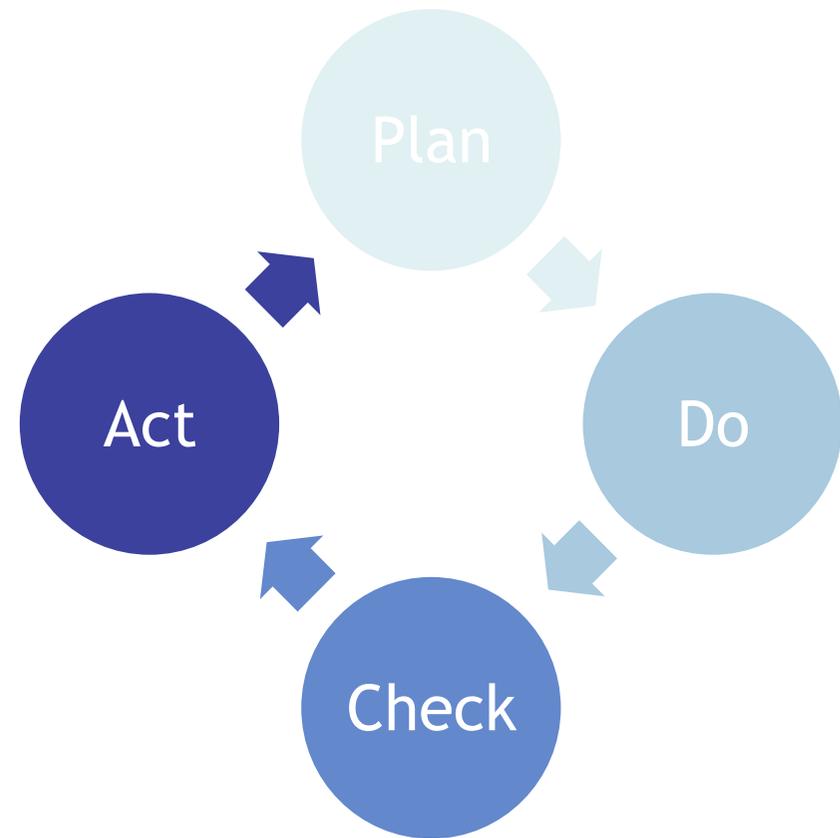
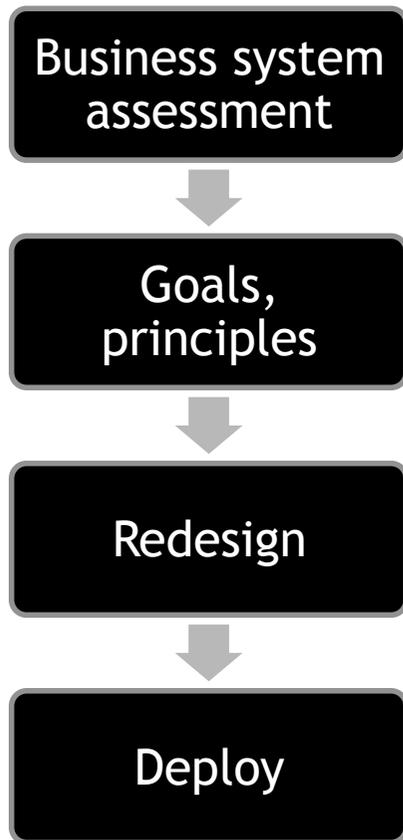
-
- Organizational values (ideals)
 - Policies (constraints)
 - Attitudes and assumptions (ideas)
 - Behaviors (actual practice)

Hansei (反省)- The Art of Reflection





Kaikaku (計画) vs Kaizen (改善)



Buzztime PDS Keikaku

Before

- Lead Time: 235 days
- Silos with handoffs
- Physical distance
- Poor Information Mgt.
- Vague goals
- Ad hoc product mgt.
- Information hoarding

After

- Lead Time: 60 days
- Cross-functional teams
- Dedicated spaces
- Streamlined specs
- Value-driven design targets
- Visual workspaces
- Roadmaps, transparency

SUBMITTED CONCEPTS

DOCUMENTED

Submitted
REV

Submitted
REV

X Holding
Timers
Size
Rate
Power
Energy
Cost
Risk

QUALIFIED CONCEPTS

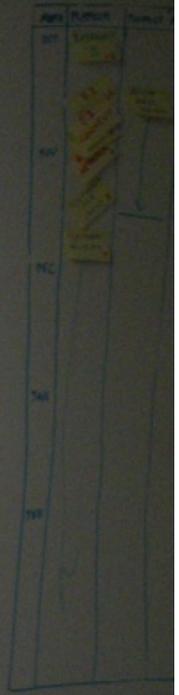
PENDING

APPROVED

- 6 ESTIMATE
- ENERGY
SOLUTION
ESTIMATE
- AD
TEMPORARY
ESTIMATE
- 1 ESTIMATE
- ESTIMATE
- 4 CONCEPT REVIEW
ESTIMATE
- 2 ESTIMATE
- 5 ESTIMATE
- 3 ESTIMATE

CONCEPT RANKINGS

RANK	PLATFORM	PRODUCT	USE
1	CONCEPT REVIEW	ENERGY	ENERGY SOLUTIONS
2	CONCEPT REVIEW	ENERGY SOLUTIONS	ENERGY SOLUTIONS
3			ENERGY SOLUTIONS
4			
5			
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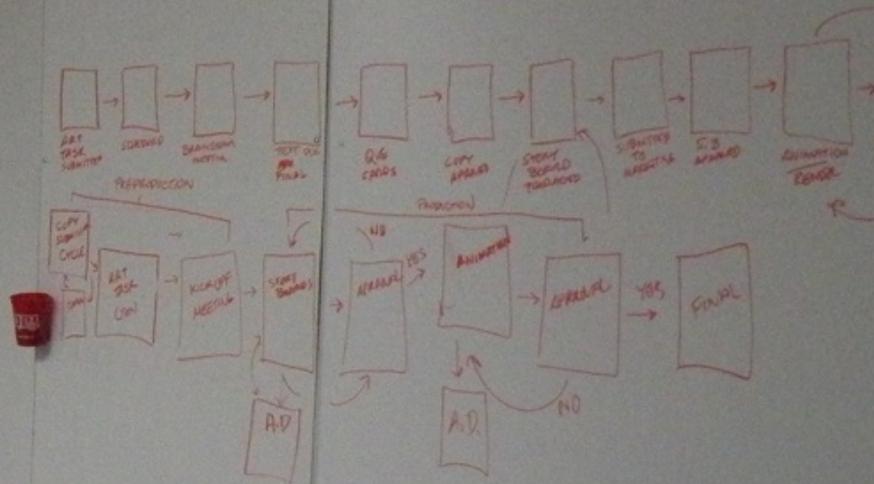


CONCEPT RANKINGS

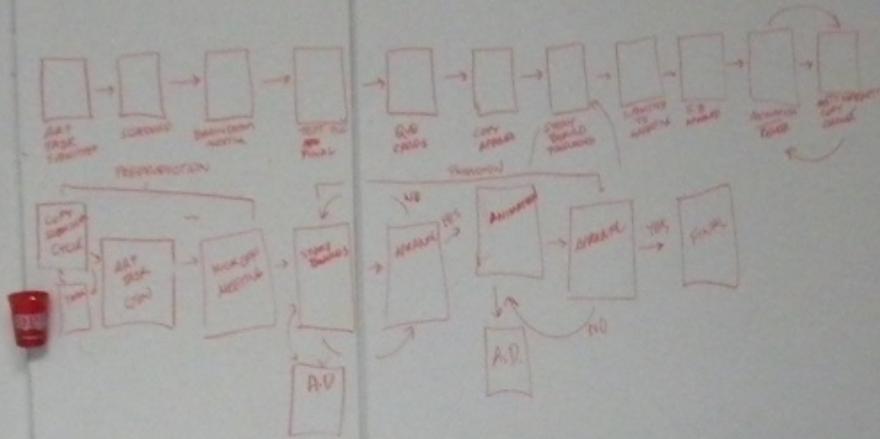
RANK	PLATFORM	PRODUCT	USE
1	CLOUD CONTENT MGMT	SEARCH	ANALYTICS
2	DATA SCRAPING UI	CONTENT CHALLENGE	SEARCH STATE
3			SEARCH VOLUME
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

ROADMAP

High	Platform	Product A	Product B	Product C	Use
Q1	SEARCH		SEARCH		
Q2	SEARCH		SEARCH		
Q3	SEARCH		SEARCH		
Q4	SEARCH		SEARCH		
Q1	SEARCH		SEARCH		
Q2	SEARCH		SEARCH		
Q3	SEARCH		SEARCH		
Q4	SEARCH		SEARCH		
Q1	SEARCH		SEARCH		
Q2	SEARCH		SEARCH		
Q3	SEARCH		SEARCH		
Q4	SEARCH		SEARCH		



CURRENT PRODUCT DEVELOPMENT



INTEGRATION / TESTING

CURRENT SCHEDULE

PORTFOLIO PERFORMANCE

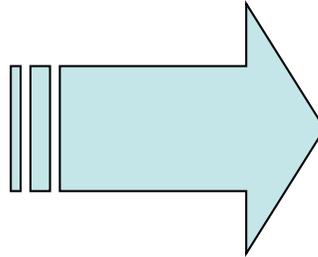
EVALUATION



Leadership Traits

Production mindset

- Requirements
- Design
- Testing
- Deadlines
- Accountability
- Evaluation
- Results



Learning mindset

- Value
- Solution options
- Experiments
- Decisions
- Encouragement
- Growth
- Discovery

Conclusion

Lean = Value Thinking everywhere, from strategy to paperclips
+ Systems Thinking (process, product, people)
+ Set of Practices/Tools (production, product development, strategy)
+ Org. Values: humility, collaboration, innovation, learning, teaching
+ Non-stop education and mentoring for leaders, managers, staff
+ Purpose: non-stop organizational learning to create value

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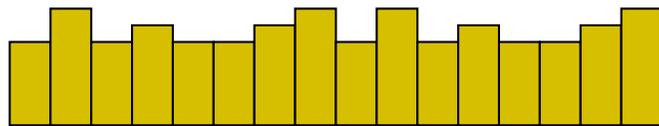
A3 Report – Making Kaizen Happen



1. Background – what is the problem about?

Customer churn rate is too high

2. Current state – what can we see/measure?



3. Future state - goals

50% reduction within six months

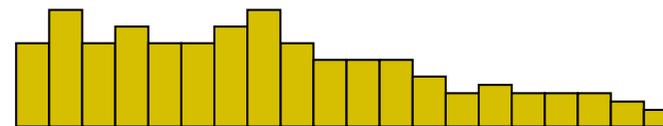
4. Root cause analysis

Poor customer support and little perceived business value in a difficult biz environment

5. Implementation / counter-measures

- Reduce call wait time below pain threshold
- Improve playtime during off-peak hours
- Offer free service to help affiliates grow
 - Local media exposure
 - Internet promotion

6. Effect confirmation



7. Follow-up

1. Verify improved customer support rating
2. Verify affiliate revenue improvements

A3 Process and Employee Development



- **Teach objectivity** – grasp the **actual facts** of the situation
- **Logical thinking** – Problem → Cause → Solution → Validation
- **Dual purpose** – achieve biz results and teach problem solving
- **Focus** – gather information, interpret it, visualize
- **3D Alignment** (up/down, horizontal, past/future)
- **Consistency** – a common language/method
- **Big-picture viewpoint** (relate to company goals)

Case study: large defense program 1/2



- Evaluated component reuse strategies at the start of the program
- Provided an analysis of the program and developed a Lean strategy
- Presented Lean strategies to managers
- Trained managers in Lean Software Development basics
- Trained program staff in Lean Software Development basics
- Trained program staff in Defect Prevention basics

- Evaluated
 - processes to suggested areas that needed focus
 - the program's information architecture (e.g. spec formats)
 - the program's product architectures from a complexity perspective
 - physical working conditions/seating arrangements
 - the program's team structure

Case study: large defense program 2/2

- provided Lean leadership coaching
- prototyped a reporting system based on inventory flow in the value stream
- conducted Kaizen workshops to map and reengineer value streams
 - for software development and delivery
 - for contract change management

The lead time for delivering new software features has been reduced by 76%, and the lead time for responding to customer change notifications has been reduced by 66%.

