

Webinar

Quality & Risk Management Challenges when acquiring enterprise systems

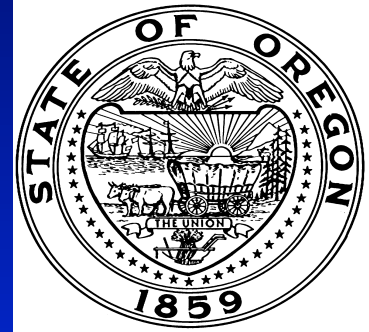
Ying Ki Kwong
Philip Lew

June 4, 2019

This presentation is based on a paper presented at PNSQC 2018:

https://www.pnsqc.org/wp-content/uploads/2018/06/Kwong_LewPNSQC_2018_paper.pdf

Moderating Today



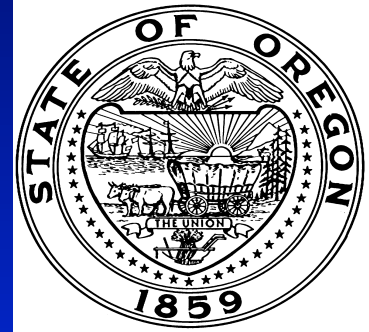
Philip Lew

PNSQC Board Member and Program Chair



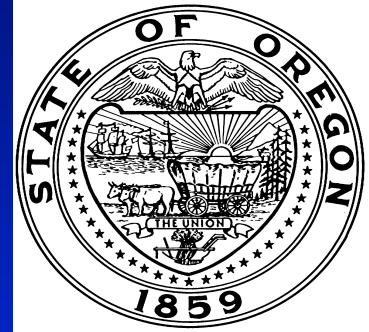
- CEO, XBOSoft
- Relevant specialties and passions
 - Software quality process, evaluation, measurement and improvement
 - Software quality in use / UX design
 - Mobile User Experience and usability
 - Cycling and travel

House Rules



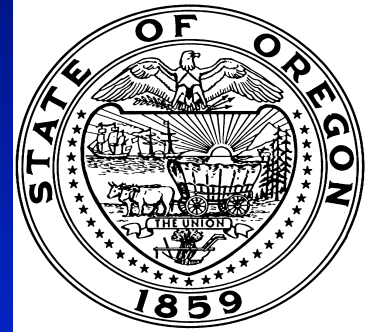
- Participants other than the speakers are muted
- Questions via the control panel on the right side of your screen or through Twitter @PNSQC
- Questions may be asked throughout the webinar - we'll try to answer them at the end
- You will receive info on recording and slides after the webinar

PNSQC – The Organization



- The oldest software quality conference in North America now in its 37th year.
- Annual conference held in Portland, Oregon.
- Non-profit organization run by volunteers.
- PNSQC is an all volunteer conference that focuses on the quality practitioner.
- Conference speakers and participants are people describing their own experiences, not by consultants.
- A range of topics and speakers - everything from distributed teams to agile, devops, automation, security, and management; private & public sectors.
- All papers are peer reviewed.

Presenting Today



Ying Ki Kwong
PNSQC speaker (2008, 2016, and 2018)



- Statewide QA Program Manager
Office of the State CIO, State of Oregon
- Relevant specialties and passions
 - Quality & risk management
 - Enterprise IT project management
 - Complex systems and complexity
 - Volunteering for local nonprofits and travel

**Context of an enterprise IT project
from the perspective of the acquiring organization**

Major enterprise IT projects is an investment

▪ Business Case

- Business model or operational paradigm changes (if any)
- Business drivers and high level business requirements
- Solution approaches (relative cost vs benefit vs risks)
- Solution approach chosen & key success factors

▪ Available solution approaches

- Often built around a base system (COTS or transfer) with customization
- “Gaps” as measures of project complexity
- Custom system as solution approach of last resort

▪ Costs

- Life cycle cost important

Solution Approach - Top 5 IT Projects in Oregon State Government

Agency / Project	Budget*	Solution Approach
Dept. of Human Services	\$335 M	Transfer with customization
Dept. of Justice	\$133 M	Transfer with customization
Dept. of Transportation	\$ 90 M	COTS with customization
Health Authority	\$ 28 M	COTS with customization
Dept. of Administrative Services	\$ 20 M	SaaS with customization

* Budget does not include operations & maintenance costs.

- Most enterprise projects adopt a solution approach based on customizing a base system (COTS, transfer, or SaaS).
- Minimally viable product (MVP) has an expected cost that is a substantial fraction of overall budget, partly due to base system cost.
- Gap analysis as crucial measures of project complexity – 3 Types
 - “as is” vs “to be” operational paradigms or model
 - “as is” vs “to be” business processes
 - base system vs “to be” system features-functions

Life Cycle Cost

- **Capital costs**
 - Prime contractor / system integrator
 - Hardware, software licenses, networking & telecom
 - Internal Staff
 - *Supporting contractors (e.g. PM, analysts, and testers)*
- **Ongoing costs**
 - Operational support & maintenance - contracted
 - *Operational support & maintenance - internal*
 - *Financing or debt services*
- **“Technical debt” that reduces net benefit**
 - Software defects
 - *Non-optimal business functions or processes*
 - *Non-optimal technical architecture*

Customization

- **General scope**
 - Enterprise specific features-functions not in base system
 - *Interfaces or integration with existing or legacy systems*
 - *Conversion of data in systems being replaced*
- **Nature of technical work**
 - Configuration, Scripting, Custom code
 - *Systems integration*
- **Important considerations**
 - Cost & Time of customization vs. expected benefits
 - *Complexity of base system*
 - *Deviation from base system*
 - Support & Maintenance
 - Bifurcation from base system releases
 - Ongoing software upgrades and patching
 - Technical environments (e.g. dev, test, prod, etc.)

Prime Contractor Perspective on Quality

Factor	Contractor Perspective
Profitability	As high as possible
Meet business needs	<ul style="list-style-type: none">• doesn't matter if not in contract• matters but may cost extra
Data conversion	convert cleansed data, but happy to redo at an extra cost
System integration testing (SIT)	<ul style="list-style-type: none">• best if SIT finishes quickly so customer can start UAT• legacy systems not in scope
Test Data	no problem with using converted data – “saves time / more realistic”
Defect severity level during UAT	better if defects have lower severity level – “acceptance soonest good”

*** Challenge:** *The prime contractor and the acquiring organization have different motivations and different perspectives when come to quality & risks.*

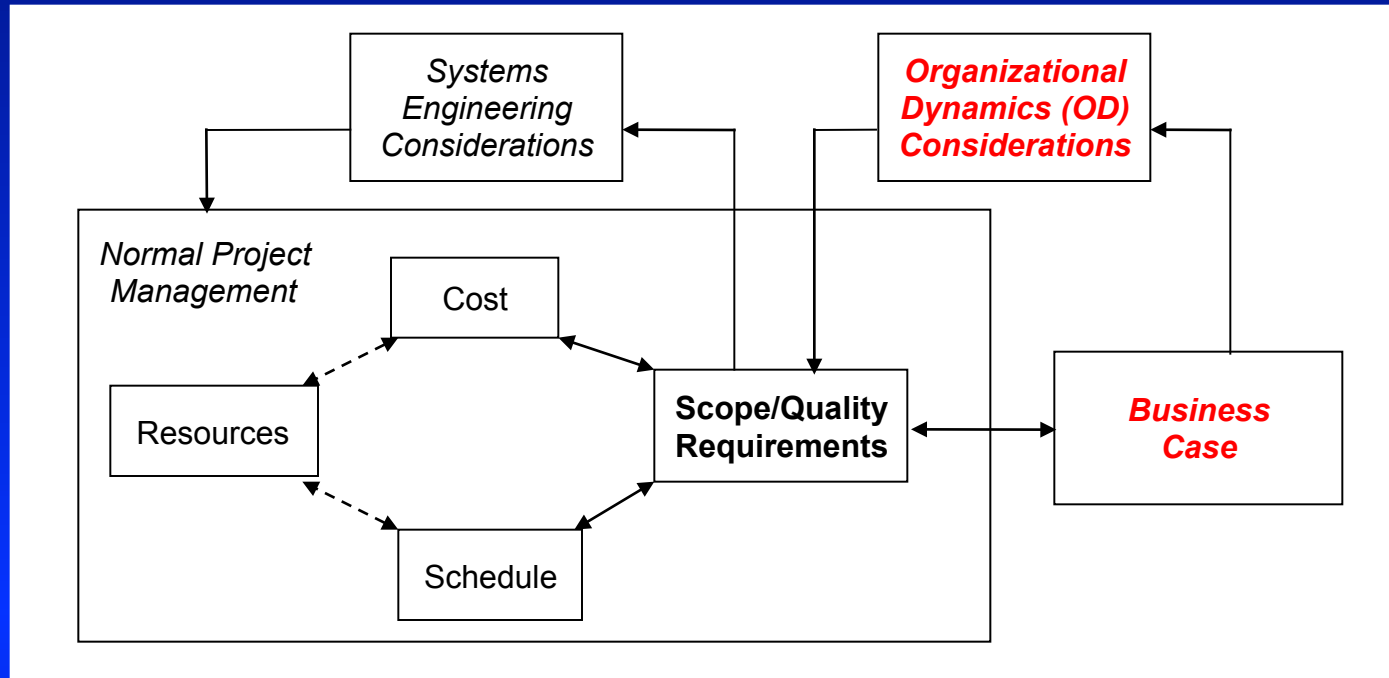
A Word on Iterative Development / Agile...

Project Characteristics Considered Good for Agile	
Requirement stability *	Low
Product novelty or innovation	High
Time to delivery	Short
Demand for work product visibility or user involvement	High
Processes & tools to support Agile *	Available
External dependency *	Low
Project team size *	Small
Team Location *	Co-located
Staff knowledge / skills in Agile	High

*** Challenges:** Major enterprise projects often have unexpectedly volatile requirements, many cross-functional and external dependencies, low maturity of processes & tools, numerous work teams in different cities...

Requirements
including user stories, use cases, features...

Are requirements knowable / discoverable?



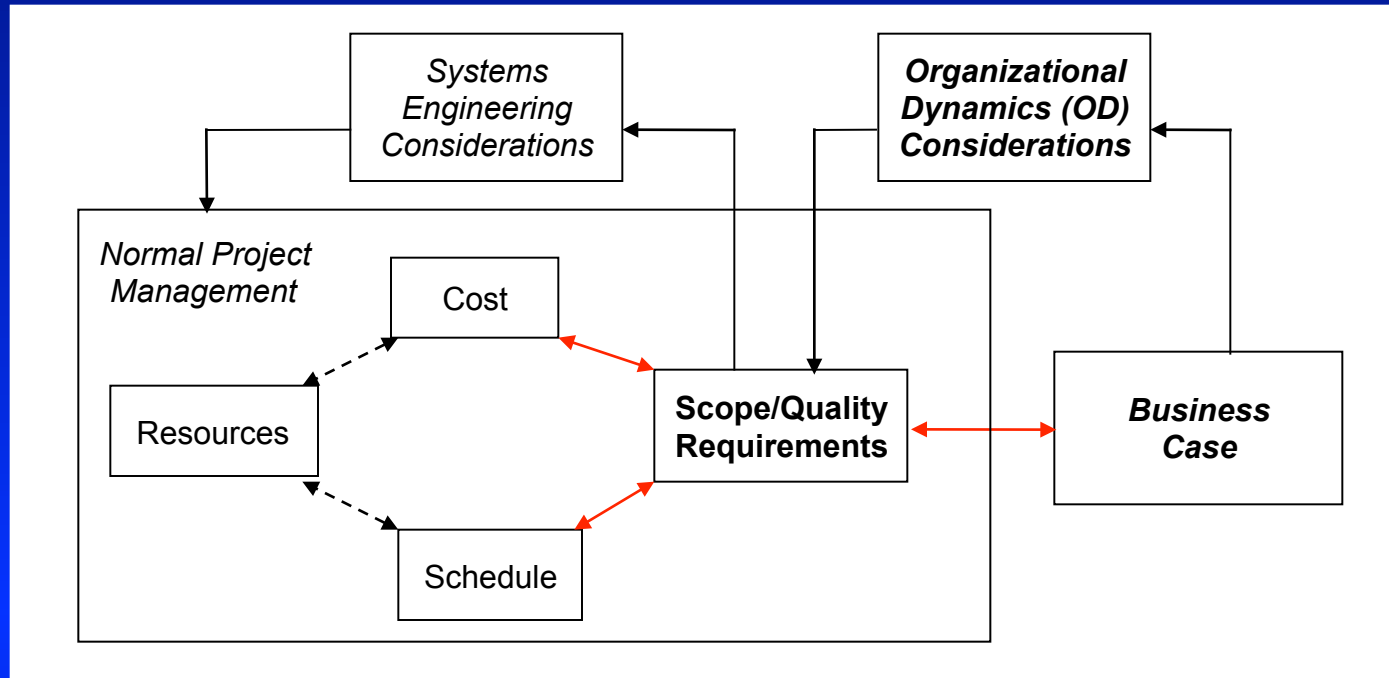
For “normal” projects, yes...

- Stable enterprise architecture / design, maturity model, roadmap
- Stable business case, with Requirements less influenced by OD
- “project triangle” – mainly system engineering considerations

For projects with organization paradigm shifts, may be...

- Uncertain enterprise architecture / design, maturity model, roadmap
- Uncertain business case, with Requirements influenced by OD
- “project triangle” – not just system engineering considerations

Are requirements reliable / stable?



- **May be. Note risks associated with subject matter experts...**
 - **Schedule** – vital to business operations and may not be available when needed
 - **Cost** – may not know tradeoffs between cost / risk of customization vs. possible benefits
 - **Subject matter expertise** – experts of “as is” business process / rules, but not necessarily expert of “to be” business process / rules
 - **Authority** – may not be empowered, e.g. change staff roles & duties
 - **Objectivity** – may be resistant to change or level of change

Organizational Readiness

Prime contractor roles in enterprise IT projects

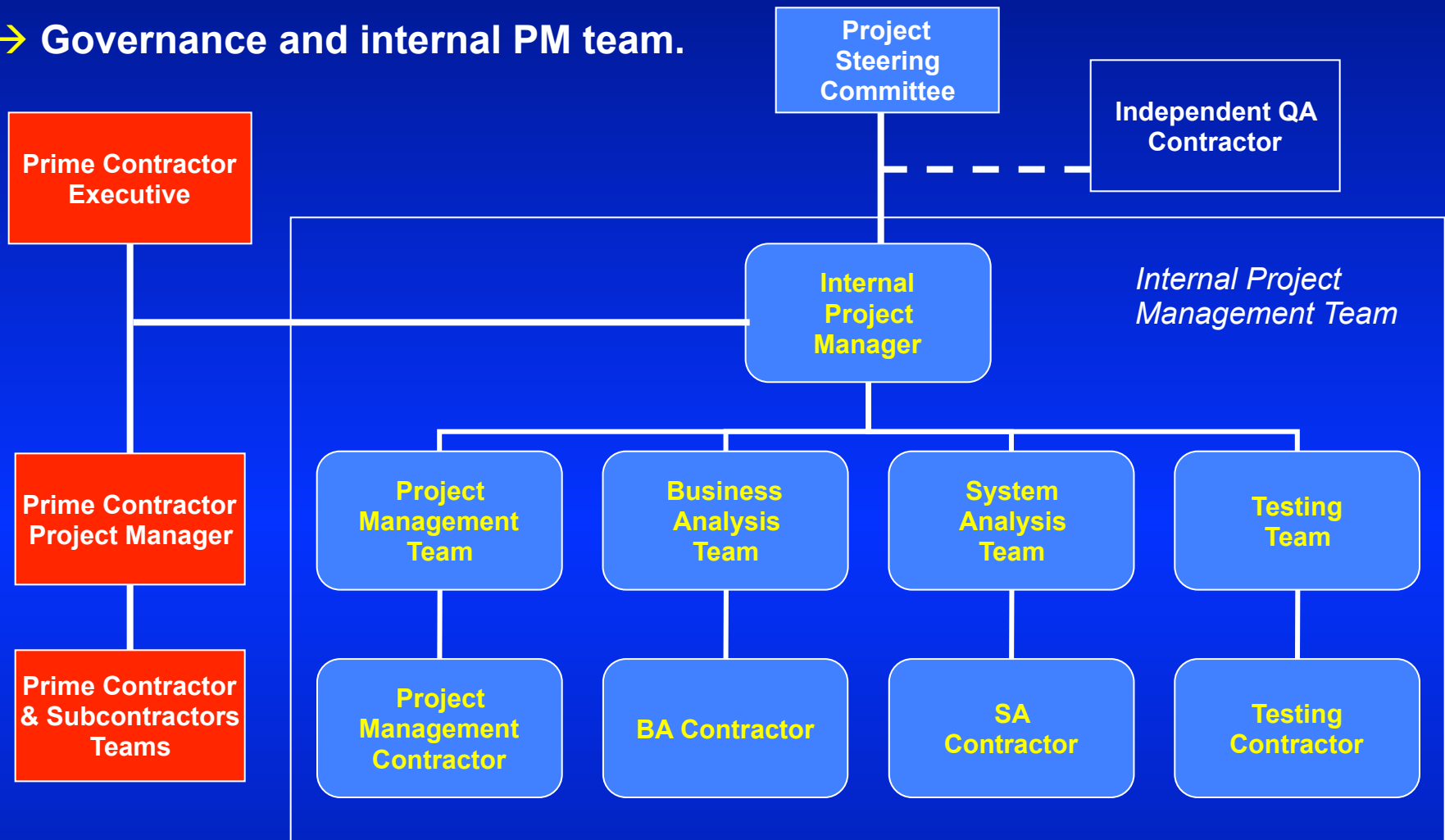
- Focus on core competence
- Insufficient resources
- Lack of skills...

Data Conversion	System Analysis	Planning & Project Mgt.
Systems Integration	Design & Develop Software	Business Analysis
Support & Maintain Systems	Training	Business Transition

→ Is the organization ready to bring on a prime contractor?

Is the organization ready?

→ Governance and internal PM team.



- Project charter, updated business case, plans, and RFP in good shape?
- Lessons learned in similar enterprises?
- Familiarity / training in contract administration, SDLC, risk management, organizational change management, and related skills?

Contracting model

Contractual Considerations

Procurement Model

- Time & Materials
- Deliverables based – fixed price or max not-to-exceed price
- Hybrid

Statement of Work (SOW)

- Acceptance criteria – often source of disputes
- Schedule slack to enable refinements of user stories, use cases, features-functions, requirements
- Contract deliverables consistent with SDLC

Iterative SDLC

INCEPTION



Product Backlog

Understand project scope
effort estimation



Requirement Understanding Document

To evolve over time. Understand
user stories

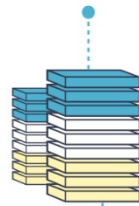


Test Plan

Prepare test plan

ITERATIVE SPRINT BASED TESTING

Sprint Backlog

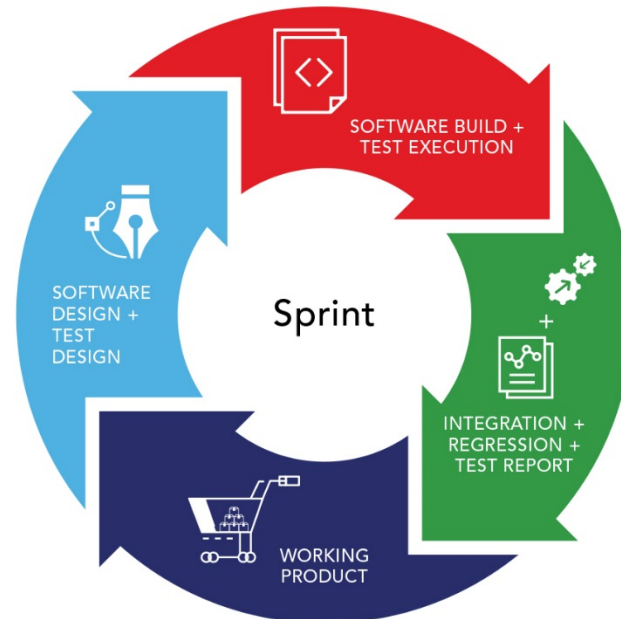


Sprint Backlog

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Open Defects



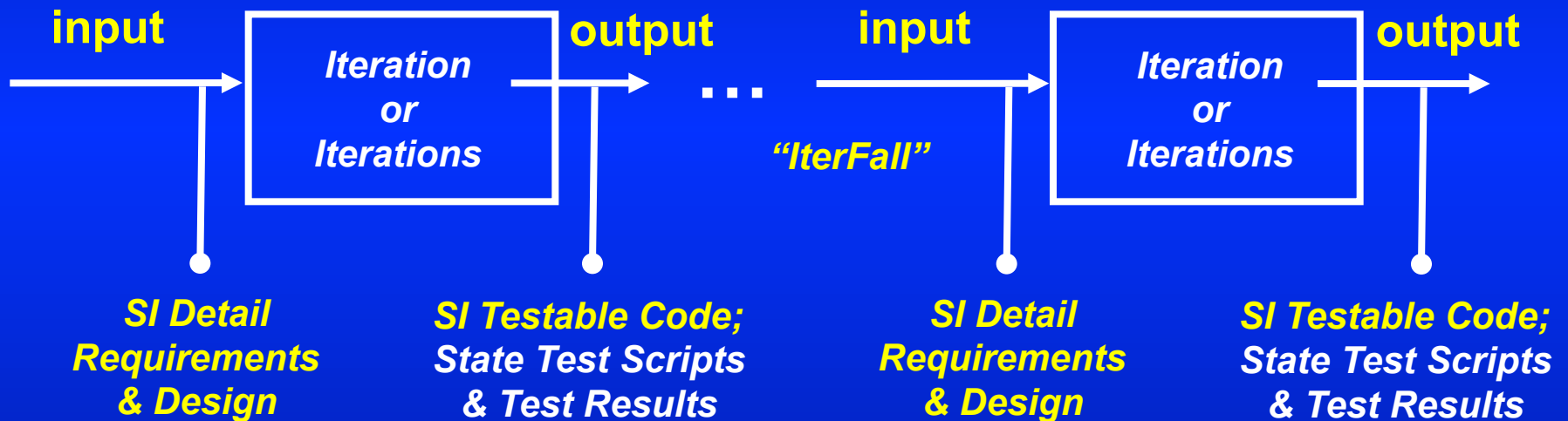
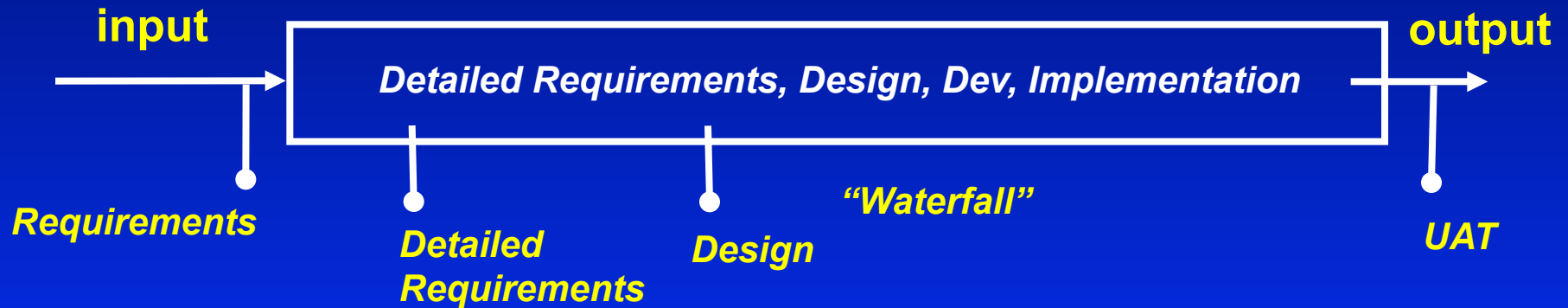
→ Sprint 1 → Sprint 2 → ... → Sprint N

FINAL PRODUCT



Final Product
Test Closure

Congruency between contract model and SDLC: Waterfall vs “Iter-fall”



→ Iterative / Agile development on a waterfall contract is not a good idea.
→ Need to align iterations with contract deliverables.

Business Aware Testing (BAT)



Scope of Testing

Testing by Types

- **Functional Testing:** user stories, user scenarios, use cases, ..., features-functions, requirements
- **Non-Functional Testing:** performance, load, stress, ...
- **Government Required Testing:** connectivity, certification, ...

Testing by Focus Areas

- **Accessibility Testing**
- **Security Testing**
- **Data Conversion Testing**
- **System integration Testing (including interfaces to Legacy)**
- **End-to-End Workflows (including interfaces to Legacy)**

Testing by SDLC Time Frames

- **Pre-UAT (UAT = User Acceptance Testing)**
- **UAT**
- **Pilot**
- **Enterprise-wide Rollout**

Entry and Exit Criteria based on test results IMPORTANT

SIT Exit Criteria

- SI completed all SIT test cases
- Severity Level 1 Defect = 0 and Level 2 Defect = 0

UAT Entry Criteria

- SIT Exit Criteria met
- State's test cases ready

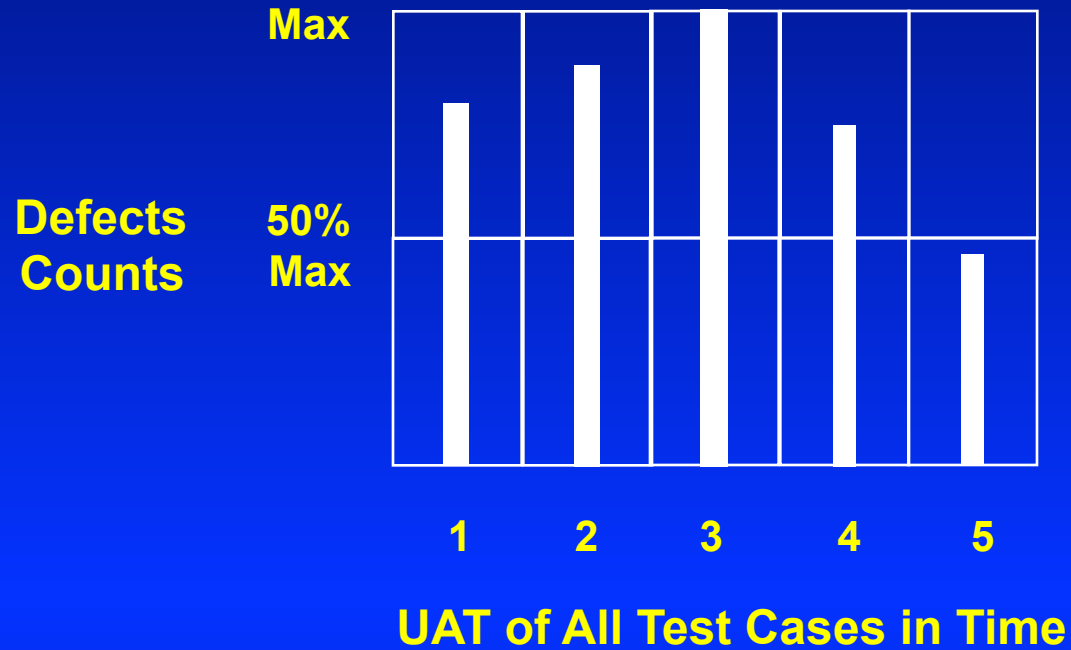
UAT Exit Criteria

- Severity Level 1 Defect = 0
- Severity Level 2 Defect = 0 or as agreed with SI
- Shape Metric requirement met – see next slide

Pilot Entry Criteria

- UAT Exit Criteria met and Fed approval to start Pilot received
- Data conversion completed & checked
- Server recovery exercise complete at hosting facility
- Business and people ready, especially training
- Rollback strategy complete

Defects Shape Metric



- Need empirical evidence that defects have stablized.
- Disputes around defect severity level common.

Managing complexity & Conclusion

Enterprise projects must manage complexity by...

- Put in place project governance that integrates all work teams and relevant business functions.
- Develop project roadmaps that integrate relevant business functions and IT.
- Coordinate cross-team / cross-function dependencies methodically and carefully.
- Assure end-to-end functionality of work products across all work teams and relevant business functions.

→ These are elements of good systems engineering
→ They are important for all SDLCs, including Agile At Scale.

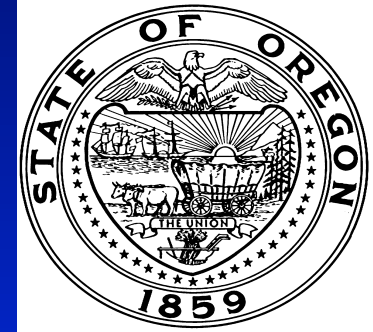
Conclusion

- There are many facets of quality when acquiring enterprise systems.
- Contractors and the acquiring organizations have different motivations – the meaning of quality & risk are fundamentally different.
- SDLC (including Agile and other iterative SDLC models) is an important aspect of quality but not the only one.
- A tightly coupled team doing the right work in the right way is an idealistic worldview and must be balanced by realistic expectations and pragmatism.

Enterprise projects require a culture of quality around change...

- Active organizational learning
- Common language for describing change
 - magnitude of change
 - paradigm shift of operating models
 - transformative change
- Dominant design, maturity model, roadmap
- Agility in the face of ambiguity
- Risks of a non-specific backlog

Look for the presentation “Software Based Disruptive Change Initiatives Require a Culture of Quality” at PNSQC 2019 or future Statewide QA Program webinars.



Questions & Answers

Moderator

Philip Lew

PNSQC Board Member and Program Chair

Today's webinar has been recorded and will be available via the PNSQC YouTube Channel and via Slideshare.

Registration for PNSQC 2019 opens on July 8.

Take part in our inaugural “Government & Enterprise IT Forum” at PNSQC 2019. Help select the topics that matter to you, such as...

- Governance
- Estimation & Budget
- Statement of Work
- Organization Change
- Verification & Validation
- Disaster Recovery
- other topics to be determined (watch for survey in email)

Thank you!



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