

Facilitating the Mini-Quality Attributes Workshop

A Lightweight, Architecture-Focused Method

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What happened?

We didn't pay enough attention to
the right architecture drivers.

(especially quality attributes)

Quality Attribute

Benchmarks that describe a system's intended behavior within the environment in which it was built.

Requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors.

http://en.wikipedia.org/wiki/List_of_system_quality_attributes

<http://www.softwarearchitectures.com/go/Discipline/DesigningArchitecture/QualityAttributes/tabid/64/Default.aspx>

Let's start doing QAWs!

Structured,
repeatable method!

Clarify priorities
and trade-offs!

Buy-in from
stakeholders!

The right drivers
right, up front!

Customers don't want QAWs...



We needed a workshop that was...

Fast

Repeatable

Relatable

Trainable

Reliable


Something our customers
would want to do...



THE MINI-QUALITY ATTRIBUTES WORKSHOP

The Traditional QAW


1. QAW Introduction
2. Business/Mission Presentation
3. Architectural Plan Presentation
4. Identification of Architectural Drivers
5. Scenario Brainstorming
6. Scenario Consolidation
7. Scenario Prioritization
8. Scenario Refinement










Keep everything that is awesome about the QAW, but optimized to promote:

- Speed
- Repeatability
- Relate-ability
- Train-ability
- Reliability
- Desirability

The Traditional QAW

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6. Scenario Consolidation 
7. Scenario Prioritization 
8. Scenario Refinement  Homework

Mini-QAW Agenda

1. Mini-QAW introduction
2. Introduction to quality attributes, quality attributes taxonomy
3. Scenario brainstorming
 - “Walk the System Properties Web” activity
4. Raw Scenario prioritization
 - dot voting
5. Scenario Refinement
 - While time remains, remainder is homework
6. Review results with stakeholders

QUALITY ATTRIBUTES TAXONOMY

Quality Attributes Taxonomy

Classification of common quality attributes relevant to typical stakeholder concerns.

Taxonomy Benefits

Ready starting point

Constrain exploration space

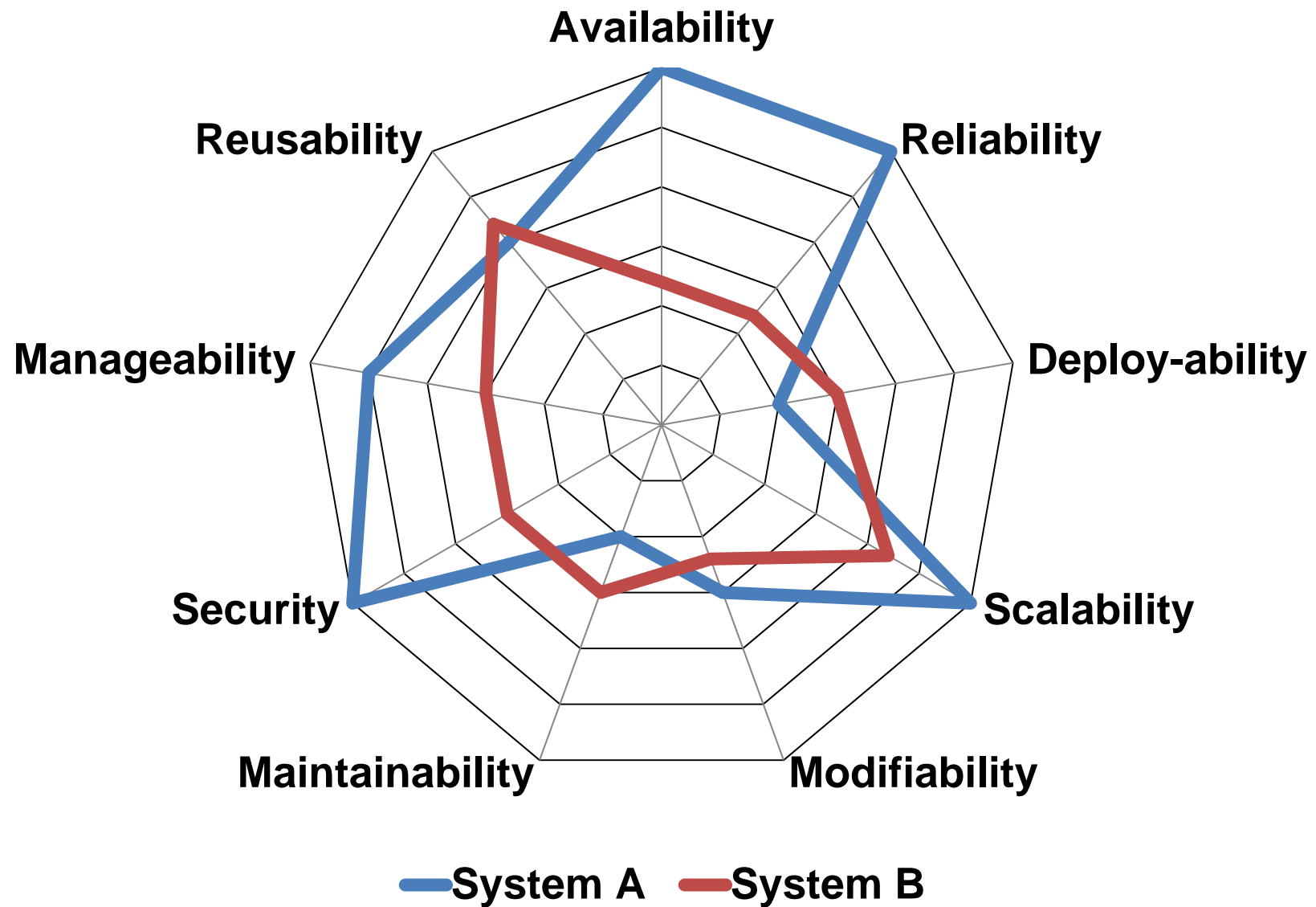
Checklist for design

Traceability to patterns, practices

Quickly educate customers

Concrete guide for facilitation

Same Properties, Different Systems



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WALKING THE SYSTEM PROPERTIES WEB

Walking the System Properties Web

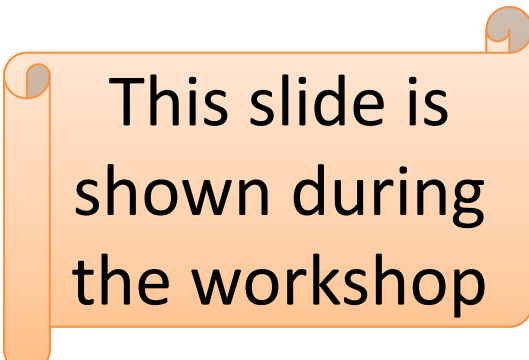
Activity Overview

- **Goal:** Guide stakeholders in identifying highly desirable system properties and specifying them as scenarios.
- **Who:** Key stakeholders
 - project managers, IT, user champions, subject experts, development team
- **Outcome:** Raw quality attribute scenarios
- **Timeframe:**
 - Depends on stakeholders, risk, complexity
 - Timeboxed activity, ends when time runs out

Walk System Properties Web

Objective: Identify and prioritize raw quality attribute scenarios.

Time Limit: [30 minutes to 2-3 hours]

An orange sticky note with rounded corners and a small tab at the top right, containing text.

This slide is shown during the workshop

Guidelines and hints:

Put the sticky close to related attributes

Don't worry about creating formal scenarios

Think about stimulus, response, environment

What are you worried about?

Watch out for features and functional requirements!

Upgrade-ability

Availability

Reliability

Crawl-ability

Query-ability

Deploy-ability

Scalability

Modifiability

Maintainability

Build-ability

Security

Manageability

Reusability

Future
Spots with
higher
security on the

High /
Low
support
years ...

Security
Index

29/7
Update
Set Maint.
.....

Upgrade to
CXD. 0.9.0
18/2019
.....

Test & build
a dist. which
works / pass test
(check)
by tests

Test the
app against
the system

Updated
functional
specs for
import to the
system

Test the
app against
the system

Test the
app against
the system

Test the
app against
the system

Test the
app against
the system

Test the
app against
the system

Test the
app against
the system

Test the
app against
the system

Simple to
install ->
Admin easily
manage

Test the
app against
the system

Test the
app against
the system

Test the
app against
the system

up grade-ability

every Performance

Availability

modifiability

Reliability

Scalability

Craw

Deploy-ability

no

Two Ways to Walk the Web...

Structured Brainstorming
Taxonomy Questionnaire

Structured Brainstorming - Overview

- **Process**
 - 3 - 5 minutes Ideation using any method (e.g. silent, round robin, etc) + time for refinement
 - Capture ideas directly on the properties web
- **Pros**
 - Fast – About 30 - 45 minutes for raw scenario generation
- **Cons**
 - May leave areas unexplored
 - Requires experienced stakeholders

Taxonomy Questionnaire - Overview

- **Process**

- Introduce each quality attribute
 - “Is this quality attribute relevant to your system?”
 - Yes – ask follow up questions
- When time runs out, the activity is over

- **Pros**

- Thorough, very repeatable

- **Cons**

- You need a taxonomy
- Workshop runs longer (allow ~2+ hours)
- Facilitator must listen closely and help “tease out” scenarios and concerns

Availability

Availability refers to the uptime of the system, that is how often the system is available and under what conditions the system might be allowed to be unavailable. Key concerns for this quality generally deal with up time, the projected system load and how the system responds to that load. Availability should be considered from both the crawl and query perspectives.

1. Are there any SLAs around availability of the system?
2. Are there defined maintenance windows where OS patches are applied, backups are performed, etc?
3. Are there requirements around QPS and/or crawl times?
4. Is there a load balancer in place?
5. Are there backup systems for the data repositories?
6. What is the maximum latency for data that is not "fresh"

See SEI's 1995 Technical Report, "Quality Attributes" by Barbacci, et al.

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Prioritize using Dot Voting

- **Process**

- Participants vote for highest priorities
 - 2 dots for quality attribute
 - $n / 3 + 1$ dots for scenarios where $n = \#$ scenarios

- **Pros:**

- Fast, visual
- Everyone has an opportunity to weigh in

- **Cons**

- Voting on raw scenarios can be confusing (but it is important for prioritizing refinement effort)
- Be aware of “lobbying” by bossy stakeholders
- Not necessarily the final scenario priorities

Reusability

Manageability

Security

Future
Sprints and
...
...
...

Simple is
better →
How easily
managed.

SAP
- need to stay
current as internal
workload.

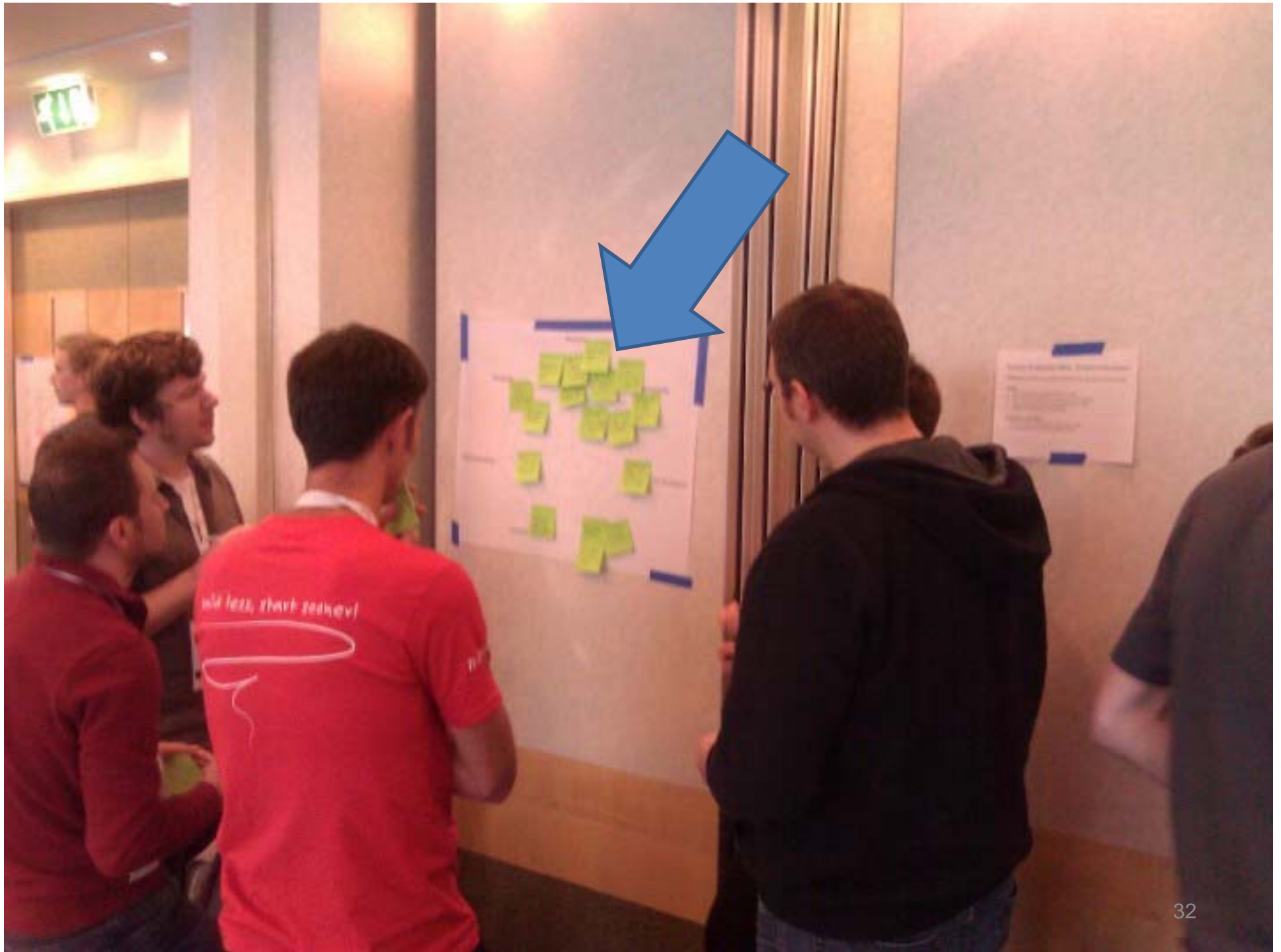
Regional/
customer rep
Access -
different demands

Upgrade to
CXD. Q4 2018
/Q1 2019
...

24/7
Uptime
Sat Maint.
...

Need to be able
to detect collective
faults / process failure
...
...
...

Asia Pacific
EMEA
support
...



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SCENARIO REFINEMENT

Formal Quality Attribute Scenario

Source: Who/what initiates the scenario

Stimulus: The event that initiates the scenario

Environment: The system or environmental conditions (e.g., normal operations, shutting down)

Artifact: Which part of system, or whole, is involved

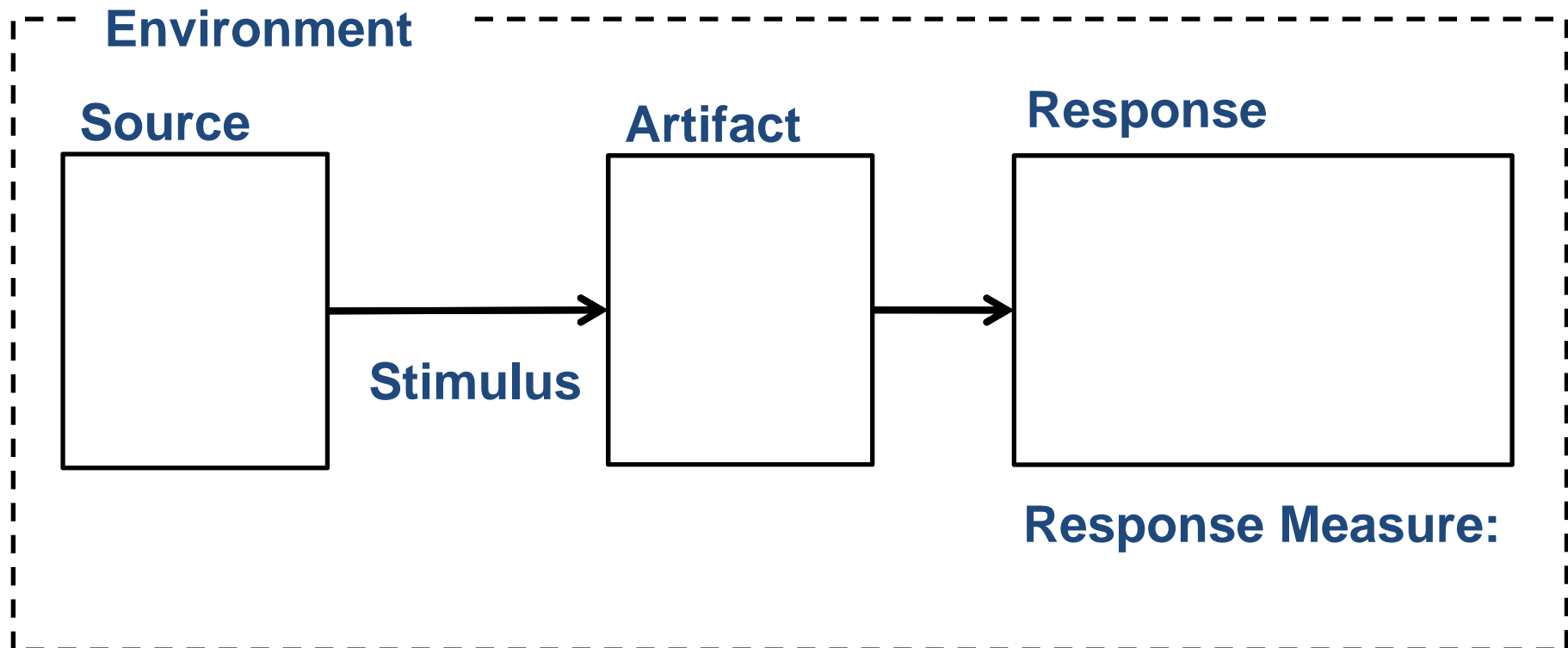
Response: What noticeable event happens as a result of stimulus

Response Measure: Quantifiable, testable measurement

Quality Attribute Name

Raw scenario summary here...

This slide is shown during the workshop



Availability

Example

Raw Scenario: In the event of hardware failure, search service is expected to return results during normal working hours for US services representatives.

Failed search server

Source

User

Executes a
search

Stimulus

Artifact

Search
service

Response

Returns results

Response Measure:

5 sec response, 12
average QPS

Homework: Scenario Refinement

- Generate scenarios based on raw notes
 - Lunch breaks, between days onsite
- Present to customer
 - Use the slide templates
- Guidelines and Hints
 - It's OK to use “Straw Man” response measures
 - Note all assumptions!
 - Beware of functional requirements disguised as quality attributes

WRAP-UP

Mini-QAW Agenda – Typical Timing


1. Mini-QAW introduction **(10 min)**
2. Introduction to quality attributes, quality attributes taxonomy **(15 min)**
3. Scenario brainstorming **(30 min – 2+ hours)**
 - “Walk the System Properties Web” activity
4. Raw Scenario prioritization **(5 – 10 min)**
 - Dot voting
5. Scenario Refinement **(until time runs out)**
 - While time remains, remainder is homework
6. Review results with stakeholders **(1 hour, future meeting)**

Creating your own Taxonomy

- Earlier QAW versions included a taxonomy and questionnaire!
 - “Quality Attributes Workshop Participants Handbook” by Barbacci et al. January 2000
<http://www.dtic.mil/dtic/tr/fulltext/u2/a455616.pdf>
- List of common software quality attributes and definitions
 - *Microsoft Application Architecture Guide, Second Edition* October 2009 <http://msdn.microsoft.com/en-us/library/ee658094.aspx>
- Not architecture-related, great example of a taxonomy-based questionnaire
 - “Taxonomy-Based Risk Identification” by Carr, et al., June 1993
<http://www.sei.cmu.edu/reports/93tr006.pdf>

Common Problems We've Seen

- Getting stakeholders in the room
- Some clients hate sticky notes...
- Knowledgeable facilitator is still needed
 - But training facilitators is easier
- Refining scenarios is as important as the workshop
 - Do not skip this step!



The Mini-QAW is **NOT** a replacement for the traditional QAW.

Mini-QAW vs. Traditional QAW

Mini-QAW


- Routine or well understood systems/problems
- Required to minimize upfront costs
- Limited experience with traditional QAW
- Relatively short overall schedule

Traditional QAW

- Higher risk projects
- System or problem is new to team
- Stakeholders prefers traditional methods
- Experienced facilitators available

Silver Toolbox





Creating taxonomies and
questionnaires is really hard.

Let's work together to make our
profession more awesome...

Thank you!



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References

- “Quality Attributes Workshop, 3rd Edition” by Barbacci, et al. October 2003 <http://resources.sei.cmu.edu/library/asset-view.cfm?assetID=6687>
- “*Taxonomy-Based Risk Identification*” by Carr, et al., June 1993 <http://www.sei.cmu.edu/reports/93tr006.pdf>
- “*Quality Attributes Workshop Participants Handbook*” by Barbacci et al. January 2000 <http://www.dtic.mil/dtic/tr/fulltext/u2/a455616.pdf>
- *Microsoft Application Architecture Guide, Second Edition* October 2009 <http://msdn.microsoft.com/en-us/library/ee658094.aspx>
- *Testing System Qualities presentation* by Rebecca Wirfs-Brock and Joseph Yoder, Agile 2012 Conference, http://submit2012.agilealliance.org/files/session_pdfs/TestingSystemQualities%20-%20Agile2012.pdf (upcoming paper covering similar topics to be published at AsianPLoP 2014)

BACKUP

