

Introduction to Architecture Centric Design Thinking

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Herbert A. Simon



The Sciences of the Artificial

Third Edition

Introduces design as a
“way of thinking.”

Herbert Simon,
The Sciences of the Artificial, 1969



Node school desk by IDEO and steelcase

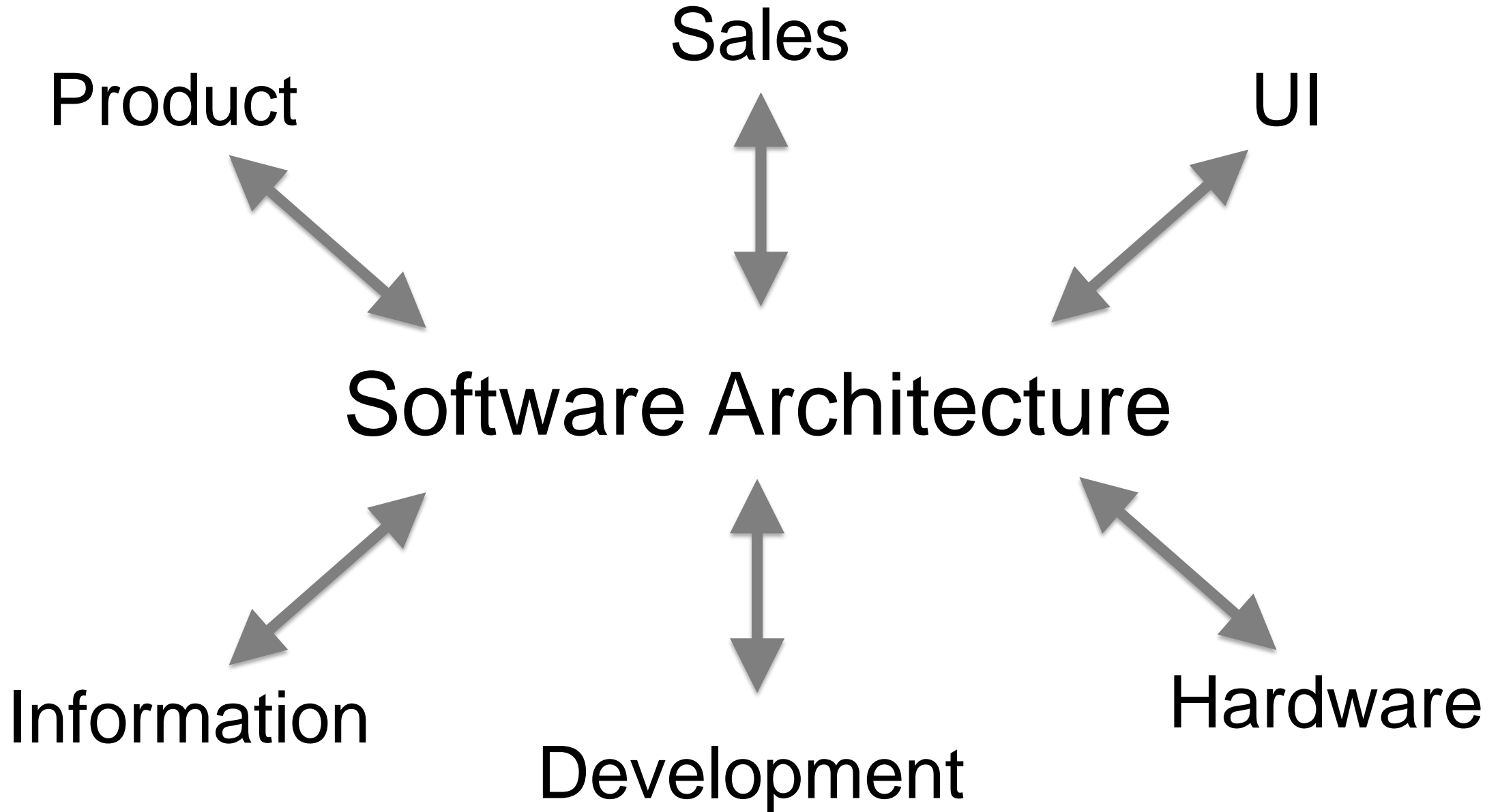




There is more to design in a software system than just the user interface.

Many different perspectives of design...

- Product Vision
- Sales / Business
- Information Architecture
- User Interface
- Hardware
- Development / Code Details
- Software Architecture



Software architecture is the foundation upon which a software intensive system is built.

Design Thinking for Software Architecture

Design thinking

From Wikipedia, the free encyclopedia

Design thinking stands for design-specific cognitive activities that designers apply during the process of designing.^[1]

[1] Visser, W. 2006, The cognitive artifacts of designing, Lawrence Erlbaum Associates.

What is Design?

- Noun
 - “The design”
- Verb
 - “To design”
- Sensibility
 - “Great design”
- Methods
 - Act of doing/creating the above

Design Thinking

1. A way of thinking about design.
2. A collection of design focused methods.

A WAY OF THINKING ABOUT DESIGN

A mindset.



A set of *modes* that can
be applied in any order.

Design Modes

Explore

Understand

Evaluate

Make



Understand

Actively seek information from stakeholders and work to (re)frame the problem.



Explore

Use generative thinking to identify design concepts and engineering approaches.

Realize design concepts by creating them in the real world as a model, prototype, program, or other artifact.

Make

Determine the fitness of design decisions
and decide whether to revisit other modes.

Evaluate

Design Modes

Explore

Understand

Evaluate

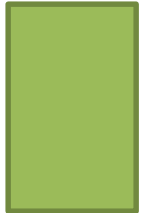
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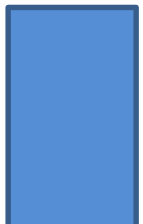
A COLLECTION OF DESIGN FOCUSED METHODS

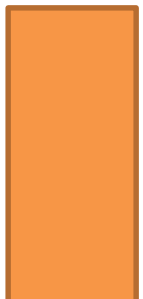
Method


An activity that embraces specific design modes and actively promotes learning.

Architecture-Focused Design Methods

 **Understand:** Quality attribute scenarios, personas, empathy map, system properties web, architecture drivers specification, user journey, elevator pitch, user mad lib, ...

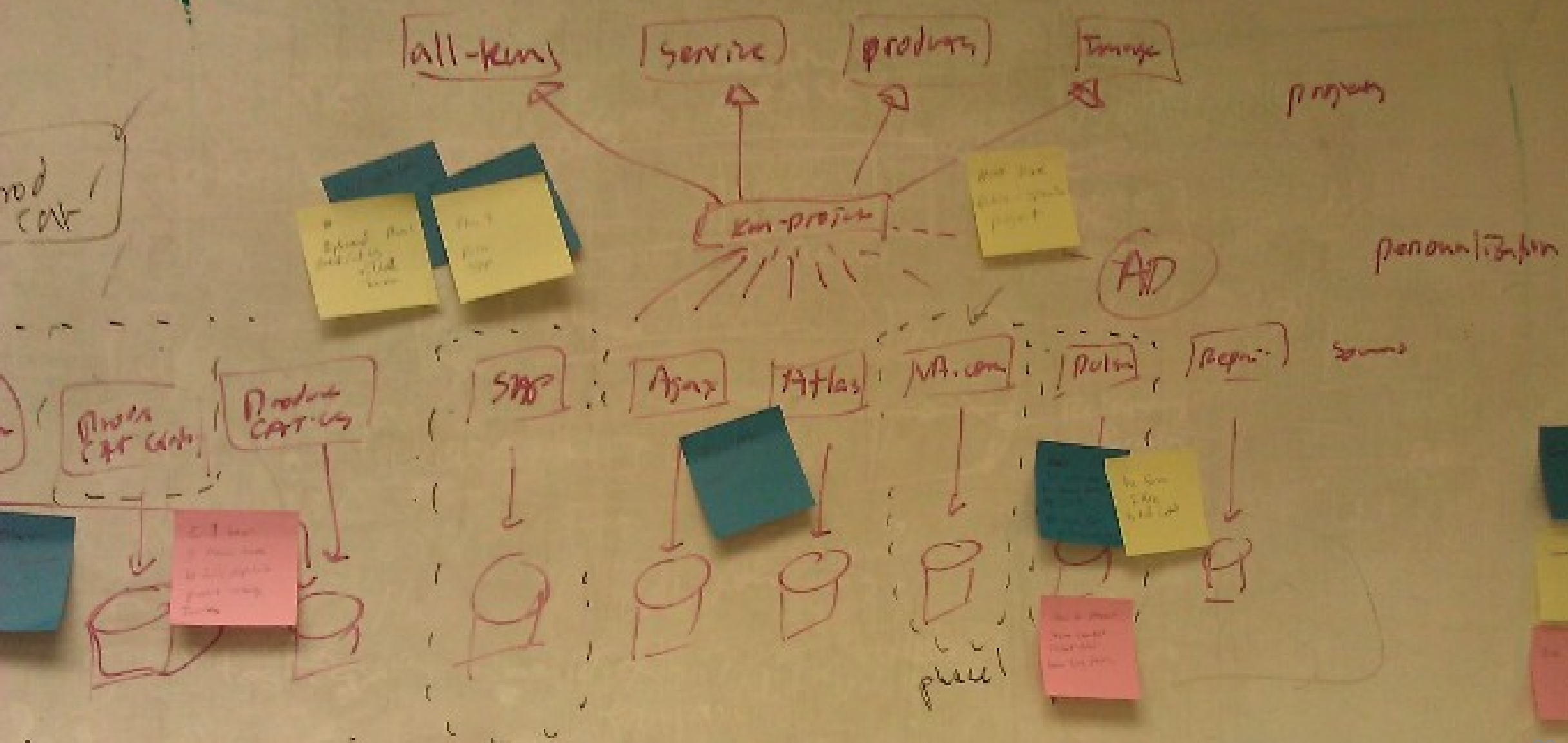
 **Explore:** System journey, design the extremes, define the design concept, yours and mine list, round-robin, estimate the elements, system research, soap boxing, paths not taken, name the styles/patterns, ...

 **Make:** Create a template, mock-ups, paper prototype, functional prototype, sketches/cartoons, architecturally evident coding style, system metaphor, architecture haiku, context diagram, utility tree, module decomposition, viewpoints and views, must reads list, ...

 **Evaluate:** Scenario walk-through, dot voting, I like/I wish/what if, feedback capture grid, risk storming, bull's eye, Question-Comment-Concern,...

Question – Comment – Concern

Evaluate



Question – Comment – Concern

Brainstorming technique that helps quickly identify and visualize specific areas in the system that may require further thought.

Benefits:

- Visualize risky or concerning parts of the system
- Promote knowledge sharing
- Identify areas in need of research or exploration

Stakeholder Maps



Understand

Stakeholder Map

A network diagram of the people involved with or impacted by a given system or system design.

Benefits:

- Identify more than the usual stakeholders
- Document, guide plans for research
- Keep focus on people rather than technologies

System Properties Web (or Quality Attributes Web)



Understand



System Properties Web

Help stakeholders to collaboratively generate, affinity cluster, and prioritize raw quality attribute scenarios

Benefits:

- Focus on system qualities over functions/feature
- Visually show how systems differ by looking at quality attributes

APPLYING ARCHITECTURE FOCUSED DESIGN THINKING

Mindset + Methods

How do I decide what to do next?

Any Order...

Explore

Understand

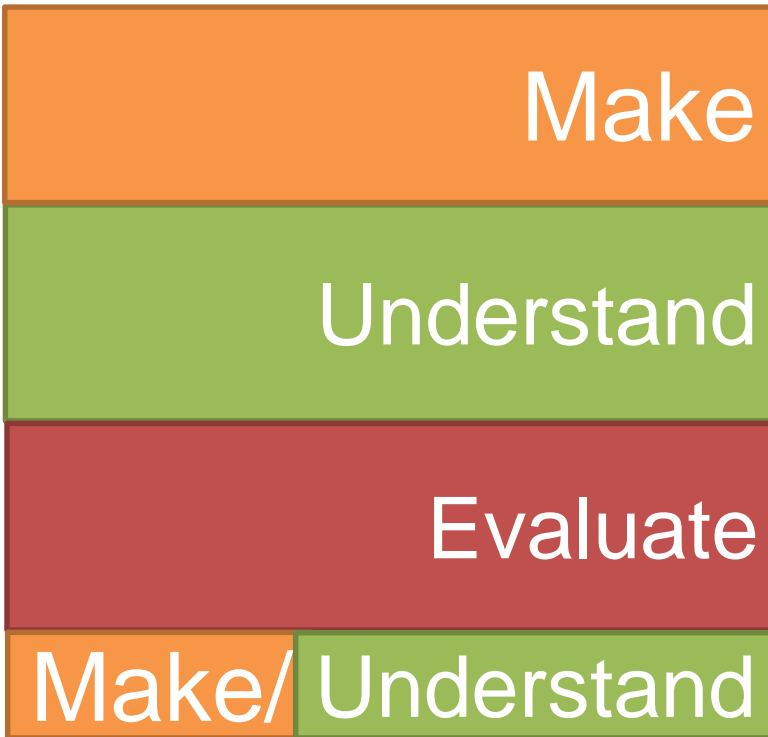
Evaluate

Make

Workshop

Ordered set of methods that help designers reach a desired outcome.

Example: Quality Attributes Workshop



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

A generalized workshop agenda.

Structure of a Workshop

- Objectives
- Agenda
- Ground Rules
- Stoke
- Design Methods
- Wrap-up

Three Fs of a Good Workshop

Fast (Don't waste our time.)

Effective (Learn what you need to learn.)

Fun (Increase engagement and creativity.)

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Set the stage
< 15 minutes

Ground rules set expectations for participants' behavior.

Agenda Tips

- No surprises
- Are the right people in the room?
- Don't forget breaks
- Be prepared
- Where can you be flexible?

Example: Ground Rules

- No right or wrong answers
- Watch the clock (I'll help too)
 - I'll give you time limits
 - When it's time, it's time
- Ask questions if you need help or clarification
- Help each other
- HAVE FUN! 😊

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Set the stage
< 15 minutes

~5 minutes

Brief activity designed to initiate active learning and encourage participation.



Example Stokes

- Say a few words
 - Sound Ball
 - Rock – Paper – Scissors
 - Yes Let's
 - High Fives
-
- Any brief activity that gets people talking or moving

Everyone has a voice.
Everyone has an opinion.

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< 15 minutes

~5 minutes

Varies...

What do you need to learn?

For the workshop overall and each activity...

Explore

Understand

Evaluate

Make

Who can participate?

How much time do you have?

Introducing a Method

1. Share the objective
2. Describe the method step-by-step
3. Show an example
4. Describe the method again (with hints)
5. Set a time limit

Structure of a Workshop

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Set the stage
< 15 minutes

~5 minutes

Varies...

Structure of a Workshop

• Objectives	Set the stage
• Agenda	< 15 minutes
• Ground Rules	
• Stoke	~5 minutes
• Design Methods	Varies...
• Wrap-up	~10 minutes

Closing a Workshop

- Reflection
- Insights
- Action Items

YOUR TURN...

Some parting advice...

There's a lot more to architecture and design than workshops, sticky notes, and pretty pictures.



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Design Modes

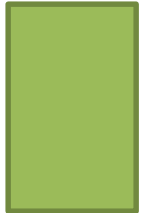
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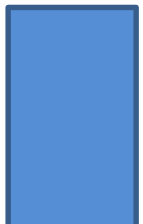
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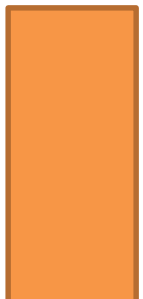
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More details available...

<http://bit.ly/sw-arch-exploration>

...feedback is welcome
and appreciated

“Great designs come from
great designers.”

- Fred Brooks

Let's work together to become better at design and grow the next generation of software architects.

Silver Toolbox



Thank you!

<http://bit.ly/sw-arch-exploration>

Worksheets, handouts, exercises, ...

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