

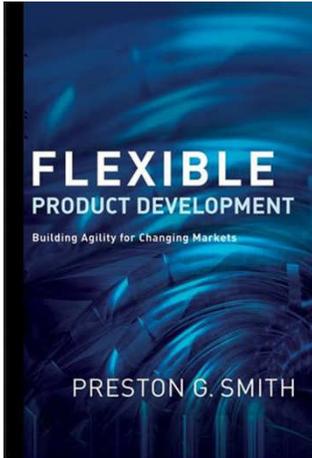
Flexible Project Management

Extending Agile Techniques beyond Software Projects

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Thanks to Preston G. Smith



Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

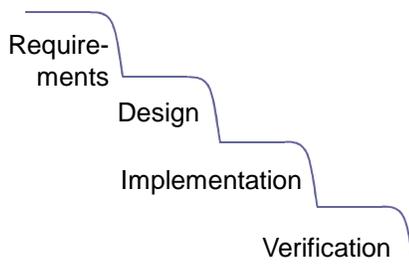
- Individuals and interactions** over processes and tools
- Working software** over comprehensive documentation
- Customer collaboration** over contract negotiation
- Responding to change** over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

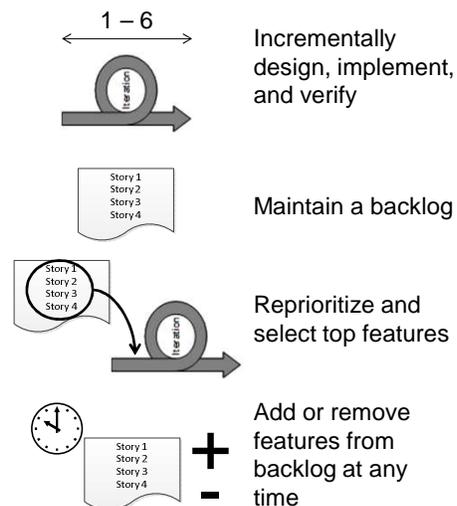
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 Source: www.agilemanifesto.org

Some Differences

Highly Predictive



Highly Adaptive



Something is Going On Here (with caveats...)

Standish, 2012-13

- Triple constraint success measure
- "All projects" data shows huge impact, but is biased
- Ten year sample size

From The CHAOS Manifesto 2012 and 2013, ©,The Standish Group International

	Small (<\$1M labor) [2013]		All [2012]	
	Waterfall	Agile	Waterfall	Agile
Successful	46%	49%	14%	42%
Failed	6%	8%	29%	9%
Challenged	48%	43%	57%	49%

Ambler, 2013

- Reporter-defined success measure
- Small sample size, 2013
- Various project sizes

From 2013 IT Project Success Rates Survey, © 2014 Scott W. Ambler + Associates

Paradigm	Successful	Challenged	Failed
Lean	~75%	~15%	~10%
Iterative	~60%	~25%	~15%
Agile	~70%	~15%	~15%
Ad-Hoc	~50%	~30%	~20%
Traditional	~45%	~35%	~20%

Software Roots of Agile

Modularization using object technologies

Low cost of automated build and test

Feasibility of automated error checking

Divisibility and incremental nature of many product features

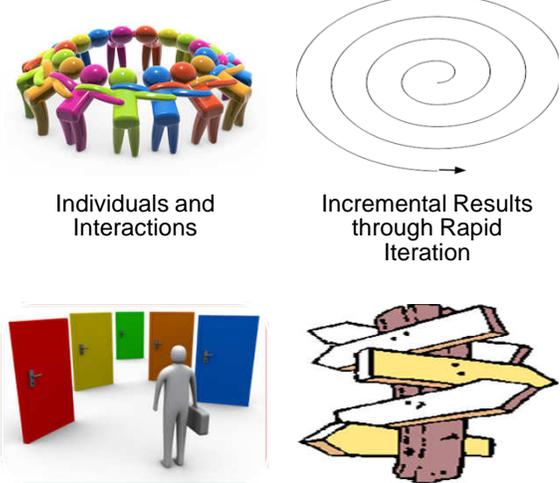
Relatively fast and easy to make and test changes

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Transferability of Four Aspects



Individuals and Interactions

Incremental Results through Rapid Iteration

Flexible Environment

Embrace Change

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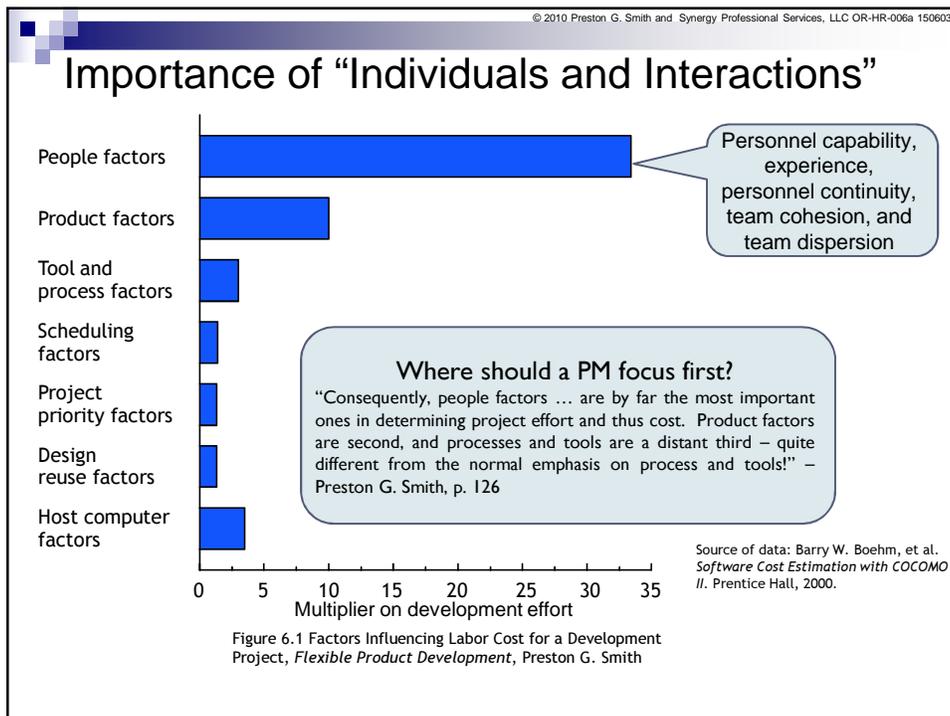
Select Project for Exercises

1. With your neighbor, select a non-software project or sub-project that one of you will be starting soon.
2. Assume you will be the project managers of this project.
3. Brainstorm what aspects of it might benefit most from an agile emphasis.
 - a. Individuals and interactions
 - b. Incremental results
 - c. Flexible environment
 - d. Embracing change



Importance of People over Tools and Process
Impact of Co-location

INDIVIDUALS AND INTERACTIONS



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Co-location Matters!

- Recent research by Reinertsen, Smith, and Olson & Olson
- Co-located (within 30'-60') project teams twice as productive

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graph TD
    A[Co-located project team] --> B[Includes all primary members of team]
    A --> C[Within 30 feet of each other]
    A --> D[Preferably within visual contact while sitting]
    
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“Our study of six teams that experienced radical collocation showed that in this setting they produced remarkable productivity improvements ... One of the main drivers of success was the fact that the team members were at hand, ready to have a spontaneous meeting, advise on a problem, teach/learn something new, etc. We know from earlier work that the gains from being at hand drop off significantly when people are first out of sight, and then most severely when they are more than 30 meters apart.” – Gary Olson and Judy Olson, University of Michigan

Sources: Preston G. Smith, *Flexible Product Development*, p. 141 -144; Gary Olson and Judith Olson, “Distance Matters”; Teasley, Covi, Krishnan, and Olson, “How Does Radical Collocation Help a Team Succeed?”

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How to Co-locate a Distributed Team

1. Expect initial resistance
2. Co-locate key sub-teams and sub-projects
 - a. Who are in the same metro area
 - b. Who will have heaviest communication links (use directed graphs to detect links)
3. Adjust product architecture
 - a. Co-locate sub-teams and sub-projects working on the same architectural modules
 - b. Minimize long-distance communication interfaces
4. If you can co-locate for only part of the project, do it initially

“It [co-location] can be unpleasant. If your neighbor did not take a bath, you will be aware of it. ... [Researchers found] that participants are reluctant to try co-location at first, but after experiencing it, they readily see its advantages.” – Preston G. Smith, *Flexible Product Development*

“I am happy to spend 70 percent of a project’s travel budget up front to get people working face to face early in the project; it pays dividends later.” – Mike Griffiths, Quadrus Development (quoted by Smith)



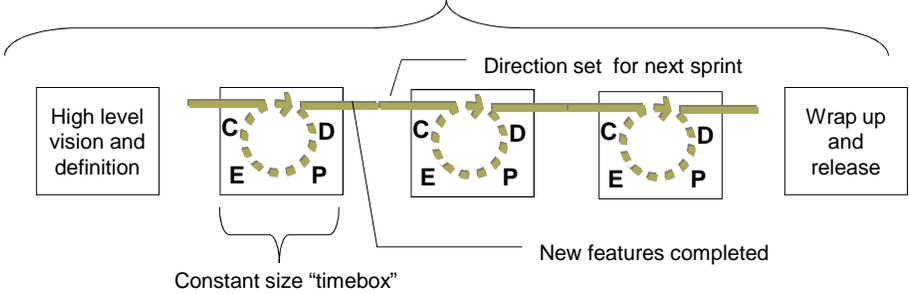


INCREMENTAL RESULTS

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Timeboxed Iterations Build Incremental Results

Single project with multiple iterations



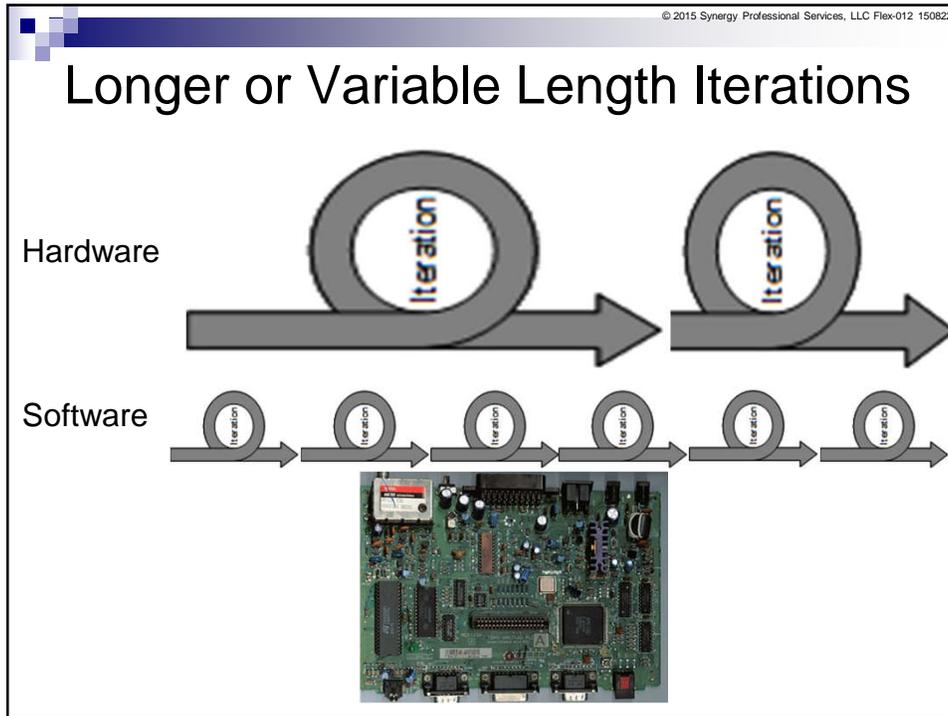
Project

- Project contains multiple sprints (iterations)
- Each sprint fits in a timebox of fixed size
- Can add or remove sprints

Sprint

- Produces incremental features or capabilities
 - Tested
 - Valuable to user or customer
- Varies deliverables (features), not time
- Feature list set at start of sprint, not before
- Defines, plans, executes, and closes





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Mockups, Prototypes and Simulation

“Use rapid prototyping to get fast customer feedback.”
Bill, Program Manager

This block contains several images illustrating prototyping and simulation. On the left, there is a blue and black plastic rapid prototype of a mechanical part, a 3D printer, and a Siemens subway car simulation. On the right, there is a simulation model of a sonar array piezoelectric behavior and a person interacting with a 3D CAD model.

Plastic rapid prototypes (L & C) created by Dimension 3D printer (R)

Simulation model of sonar array piezoelectric behavior

Interacting with 3D CAD model at the Simulation Based Design Center.

A Siemens subway car is virtually modeled during the conceptual design phase.



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People, Teams, and Iteration Exercise

- Group A – Identify the key people and skills for your project team. How will you get them onto your team and in the right roles?
- Group B – Identify two ways that you can build iteration into your project.
- Group C – How can you get your team members co-located, or if that is not possible, handle the dispersion as best as possible?

**CREATE A FLEXIBLE
PROJECT ENVIRONMENT**



Buy Options



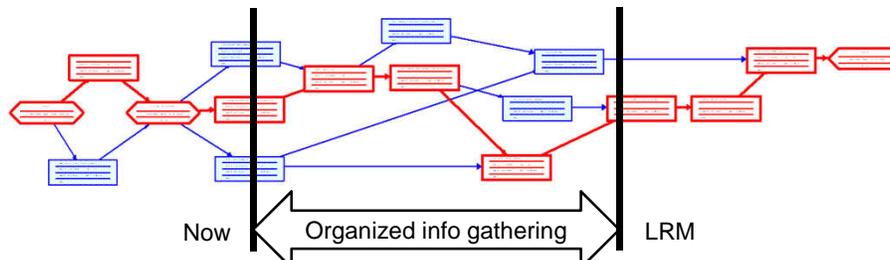
1. Slip schedule
2. Guess the winner
3. Design more expensive multi-camera interface

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Delay Critical Decisions to LRM

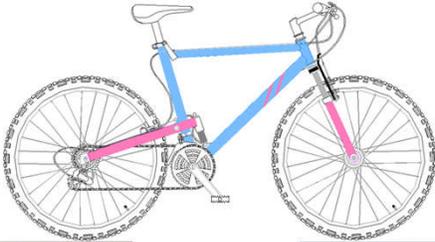
Last *Responsible* Moment is the point at which:

1. An important decision option expires
2. Important sources of information or assistance become unavailable
3. Decision goes onto the critical path
4. Risk increases substantially if decision delayed
5. Expense of carrying decision increases greatly



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Bicycle Development Dilemma





Option A: Update of tried and true bicycle hub



Option B: Hub with superior performance and cost characteristics

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Flexibility Isn't Free

Research	 Marketing Prevails! Develop Option A	 Market Test	◇	3 months \$100,000
Research	 Engineers Prevail! Develop Option B	 Market Test	 Scrap B and Develop A	◇ 5 months \$170,000
Research	Prototype Option A Prototype Option B	 Alpha Test Complete Option A	◇	3.5 months \$120,000



EMBRACE THE INEVITABILITY OF CHANGE

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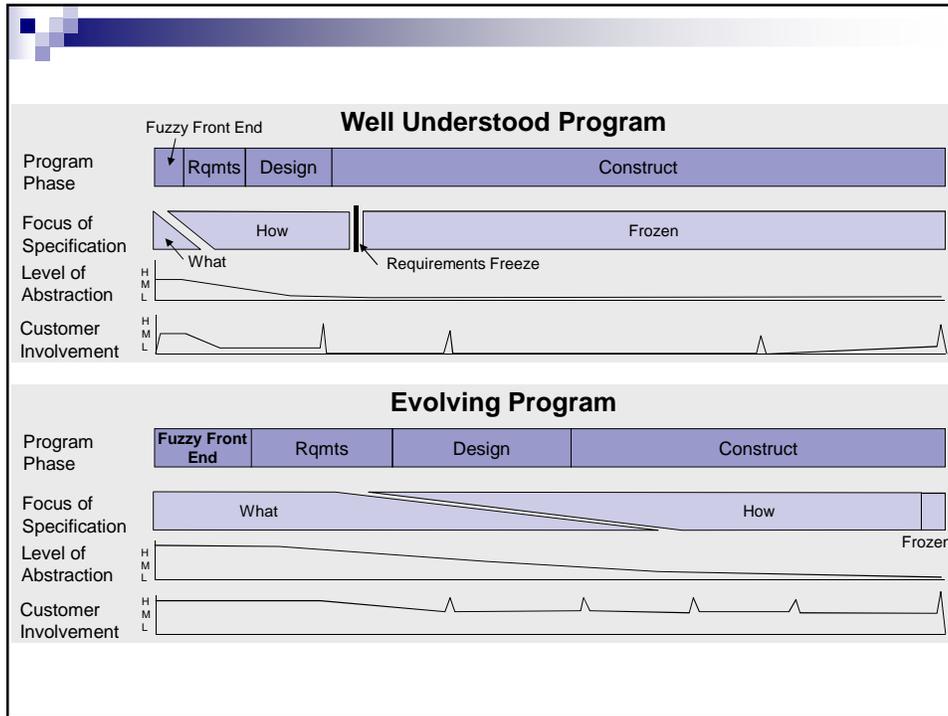
Specify Differently

Agile techniques: product vision, personas, epics, user stories

1. *What* rather than *how*
2. Stay at higher level longer



Original 1988 HP DeskJet



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Exploit Modularity

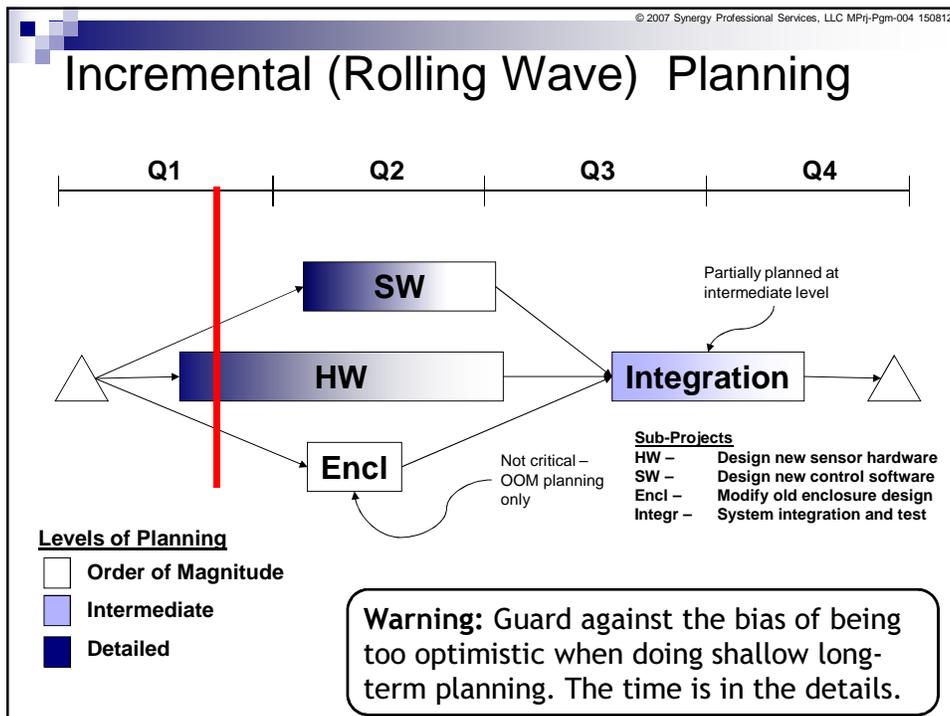
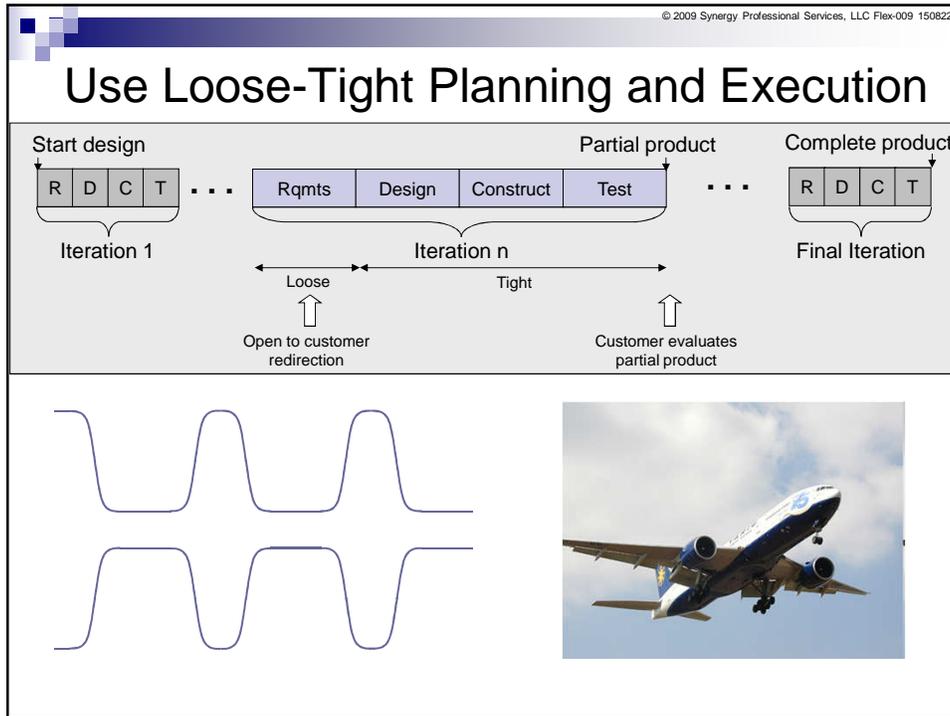


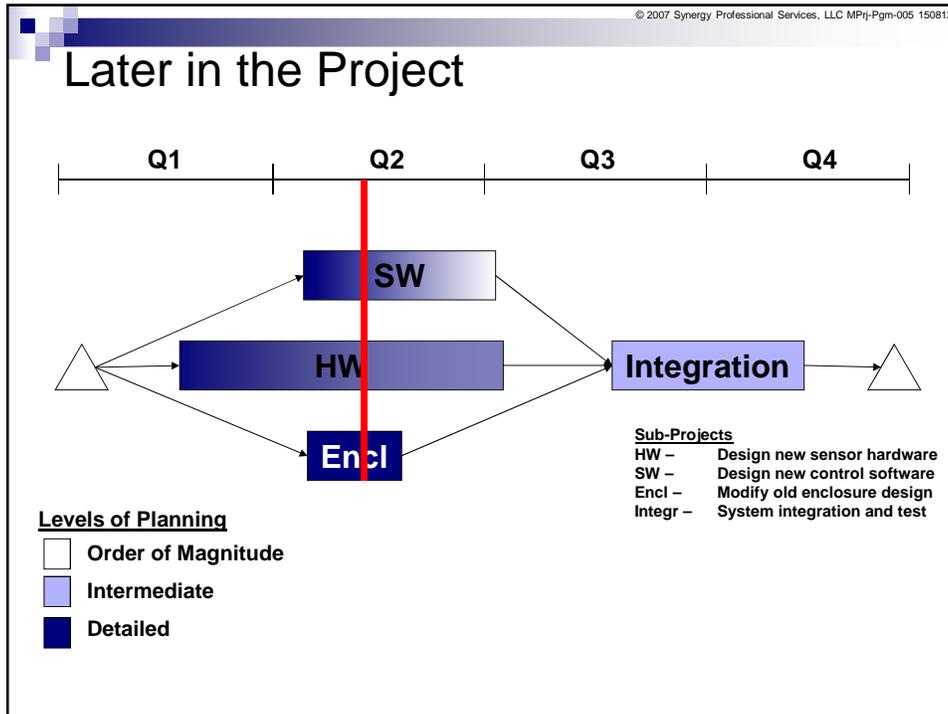
Partly completed mansion



Small simple house designed for later additions







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Flexible Techniques Exercise

- Group A – How do you plan to deal with the inevitable changing requirements on your project?
- Group B – How can you apply rolling wave planning to your project? What obstacles do you anticipate?
- Group C – Identify aspects of your project that would benefit from a loose-tight approach.



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Seven Transferable Techniques

1. Put people and the team first
2. Apply flexibility selectively
3. Plan to iterate
4. Keep your options open
5. Expect product requirements to change
6. Plan the project expecting change
7. Manage project risk continually



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- Ambler data: retrieved 8/24/15 from <http://scottambler.com/comparing-software-development-paradigms.html> See also: <http://www.drdobbs.com/architecture-and-design/the-non-existent-software-crisis-debunk/240165910>
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