

INFORMATION SYSTEMS 3A

Current Trends in System Development

Contents

- Trends in System Development Methodologies
 - Trends in Technology Infrastructure
 - Trends in Application Software Availability
 - The Web as an Application Platform

```
mirror_mod = modifier_obj
# set mirror object to mirror
mirror_mod.mirror_object

if operation == "MIRROR_X":
    mirror_mod.use_x = True
    mirror_mod.use_y = False
    mirror_mod.use_z = False
elif operation == "MIRROR_Y":
    mirror_mod.use_x = False
    mirror_mod.use_y = True
    mirror_mod.use_z = False
elif operation == "MIRROR_Z":
    mirror_mod.use_x = False
    mirror_mod.use_y = False
    mirror_mod.use_z = True

# selection at the end - add
modifier_obj.select= 1
modifier_obj.select=1
context.scene.objects.active = modifier_obj
("Selected" + str(modifier_obj))
modifier_obj.select = 0
bpy.context.selected_objects.append(modifier_obj)
data.objects[one.name].select = 1

print("please select exactly one object")

--- OPERATOR CLASSES ---

class MIRROR_OT_Mirror(bpy.types.Operator):
    bl_idname = "object.mirror"
    bl_label = "X mirror to the selected object.mirror_mirror_x"
    bl_options = {'REGISTER', 'UNDO', 'PRESET'}
    bl_description = "mirror X"

    @classmethod
    def poll(cls, context):
        return context.active_object is not None
```

Three Current Methodologies

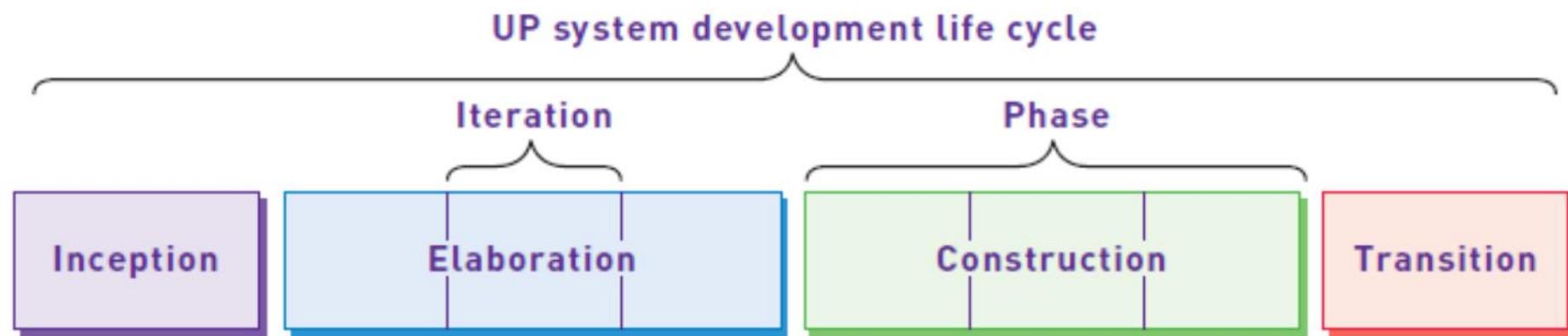
- There are many specific system development methodologies used in practice, and this chapter covers three influential ones
 - The Unified Process (UP)
 - Extreme Programming (XP)
 - Scrum
- These methodologies all use an iterative SDLC
- The Unified Process uses UML
- Extreme Programming and Scrum are based on agile principles, but the Unified Process can also be used in an agile fashion
- Many organizations mix and match features of each of these when creating their own methodology

The Unified Process (UP)

- Originally developed by Booch, Rumbaugh, and Jacobson, who previously developed UML at Rational Software (now part of IBM)
- The UP is now widely recognized as a highly influential innovation in software development methodologies for object-oriented development using an adaptive approach
- The original version of UP defined an elaborate set of activities and deliverables for every step of the development process
- More recent versions are streamlined, with fewer activities and deliverables, simplifying the methodology
- Much of the book's methodology is loosely based on the Unified Process (in an agile form)

The Unified Process Life Cycle

- The Unified Process Life Cycle model includes iterations and phases (the SDLC in this text is very similar, but left out the UP phases for simplicity)
- Each UP phase is made up of iterations. The phases are Inception, Elaboration, Construction, and Transition

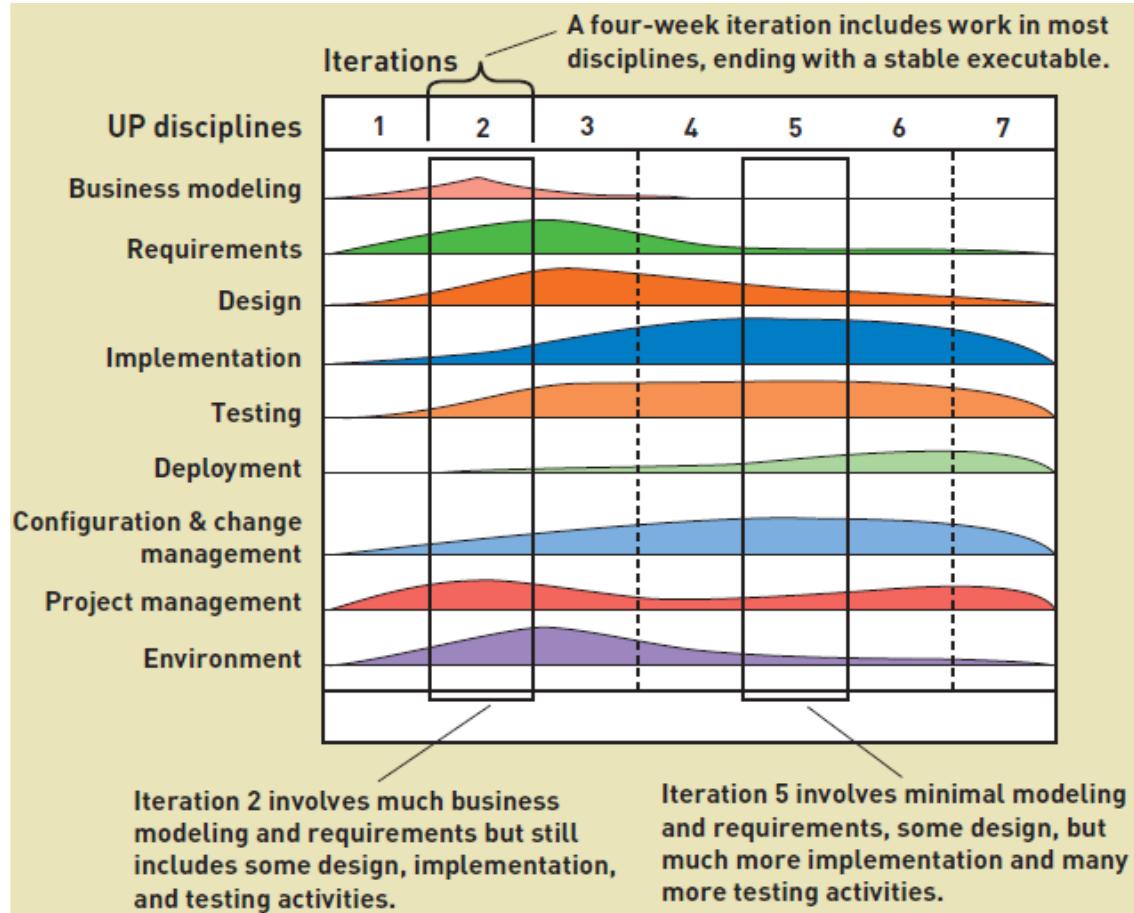


The Unified Process Disciplines

- UP Disciplines – a set of functionally related activities that combine to enable the development process in a UP project (each like a core development process):
 - Business modeling
 - Requirements
 - Design
 - Implementation
 - Testing
 - Deployment
 - Configuration and change management
 - Project management
 - Environment

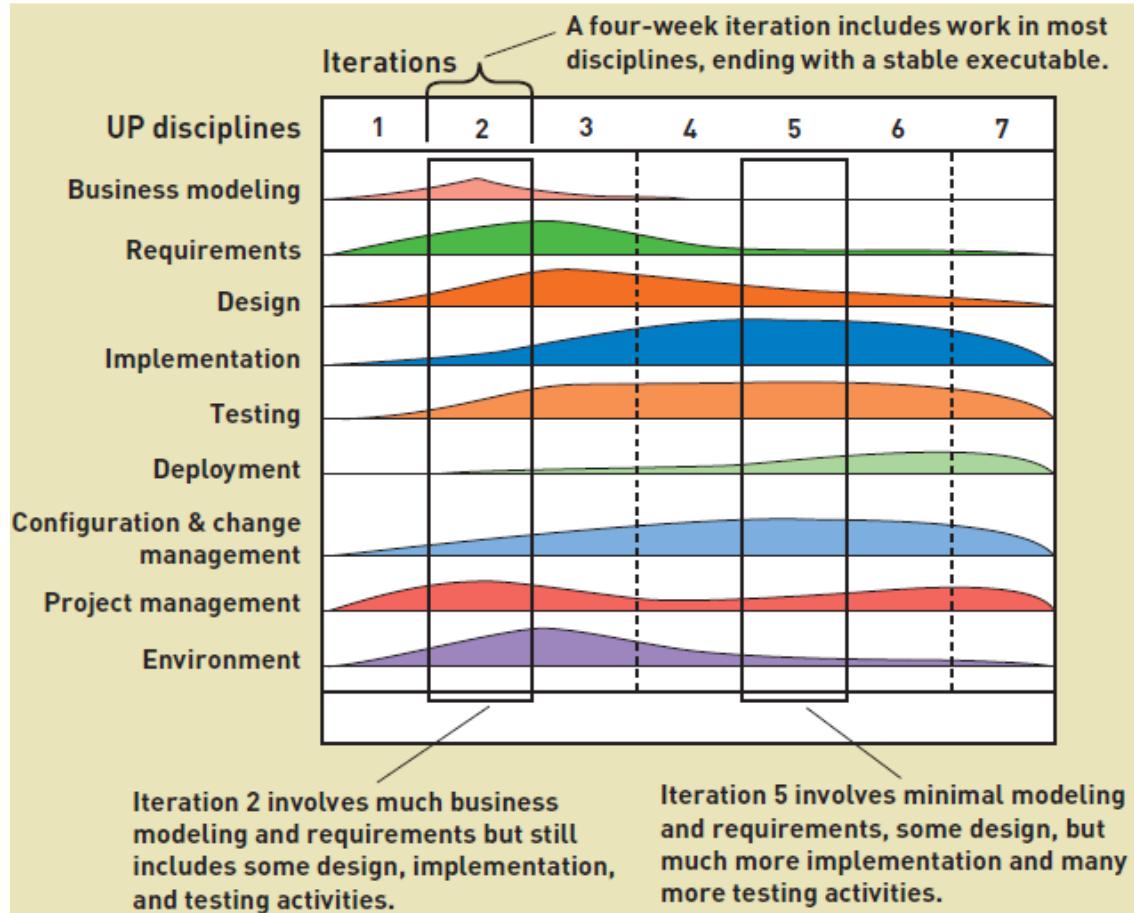
The Unified Process

Disciplines in Each Iteration



The Unified Process

Complete UP SDLC Model



The Unified Process

Philosophies/Practices

- Focuses early and often on users
- Use case driven
- Model driven – uses UML exclusively
- Iterative, but provides management structure by defining phases
- Focuses on defining an architecture
- Adaptable to needs of a specific project
- Can be made highly agile, but originally had heavy ceremony

Extreme Programming (XP)

- One of the original agile development methodologies (perhaps a reaction to the original UP) from Kent Beck
- “Extreme” often thought to be radical, but really just focuses intently on industry best practices and combines best practices in new ways
- XP is based on core values
 - Communication
 - Simplicity
 - Feedback
 - Courage
- XP also defines a set of XP practices

Extreme Programming (XP)

Core Values and Practices

XP core values	XP practices
<ul style="list-style-type: none">• Communication• Simplicity• Feedback• Courage	<ul style="list-style-type: none">• Planning• Testing• Pair programming• Simple designs• Refactoring the code• Owning the code collectively• Continuous integration• On-site customer• System metaphor• Small releases• Forty-hour week• Coding standards

Extreme Programming (XP)

Core Values

- Communication—one of the major causes of project failure is a lack of open communication among the right players at the right time and at the right level
- Simplicity—XP includes techniques to reinforce keeping things simple to make it a standard way of developing systems
- Feedback—as with simplicity, getting frequent, meaningful feedback is recognized as a best practice of software development
- Courage—developers always need courage to face the harsh choice of doing things right or throwing away bad code and starting over

Extreme Programming (XP)

XP Practices

- Planning—XP planning focuses on making a rough plan quickly and then refining it as things become clearer. This reflects the Agile development philosophical dictum that change is more important than detailed plans
- Testing—XP intensifies testing by requiring that the tests for each use case (story) be written first—before the solution is programmed
- Pair Programming—XP practice in which two programmers work together on designing, coding, and testing software
- Simple Designs—XP conforms to the principles of Agile Modeling. It accomplishes the desired result with as few classes and methods as possible and that doesn't duplicate code

Extreme Programming (XP)

XP Practices (continued)

- Refactoring the Code— refactoring is the technique of improving the code without changing what it does. XP programmers continually refactor their code to achieve a simpler design
- Owning the Code Collectively —in XP, everyone is responsible for the code. Collective ownership allows anyone to modify any piece of code.
- Continuous Integration —this practice embodies XP’s idea of “growing” the software. Small pieces of code—which have passed the unit tests—are integrated into the system daily or even more often
- On-Site Customer —as with all adaptive approaches, XP projects require continual involvement of users who can make business decisions about functionality and scope

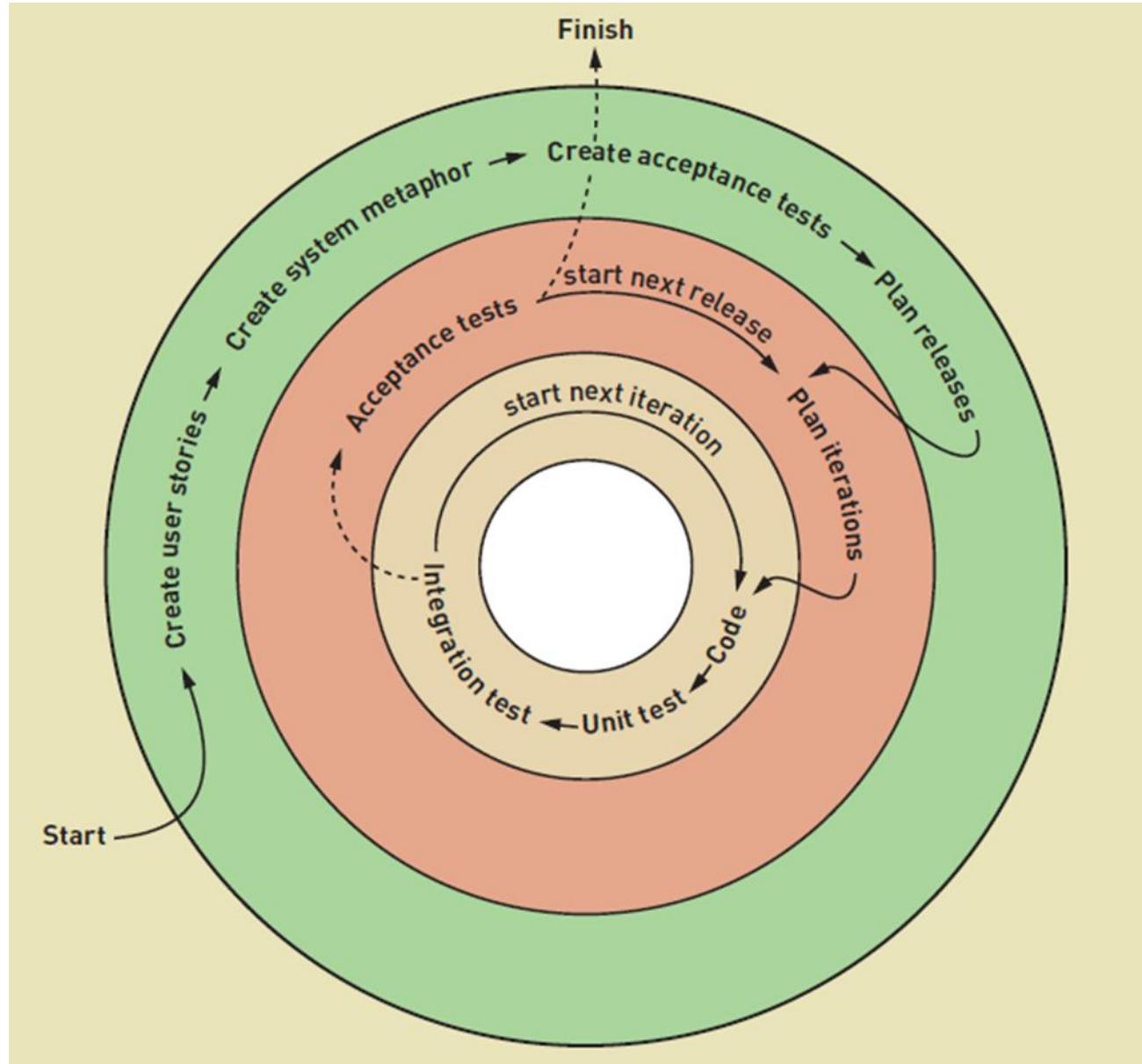
Extreme Programming (XP)

XP Practices (continued)

- System Metaphor —a system metaphor should be easily understood and well known to the members of the development team. It can guide members toward a vision and help them understand the system
- Small Releases —consistent with the entire philosophy of growing the software, small and frequent releases provide upgraded solutions to the users and keep them involved in the project
- Forty-Hour Week — the exact number of hours a developer works isn't the issue. The issue is that the project shouldn't be a death march that burns out every member of the team
- Coding Standards —developers should follow standards for coding and documentation

XP Activities

- Project Activities
- Release Activities
- Iteration Activities



Scrum

- Another influential agile, iterative development methodology based on ideas from Rugby
- A Scrum is used to get a ball back into play after a penalty--it begins quickly, is a very intense effort, involves the entire team, and usually only lasts for a short duration
- Scrum philosophy is the complete control a team exerts over its own organization and its work processes. Software is developed incrementally, and controls are imposed empirically—by focusing on things that can be accomplished.

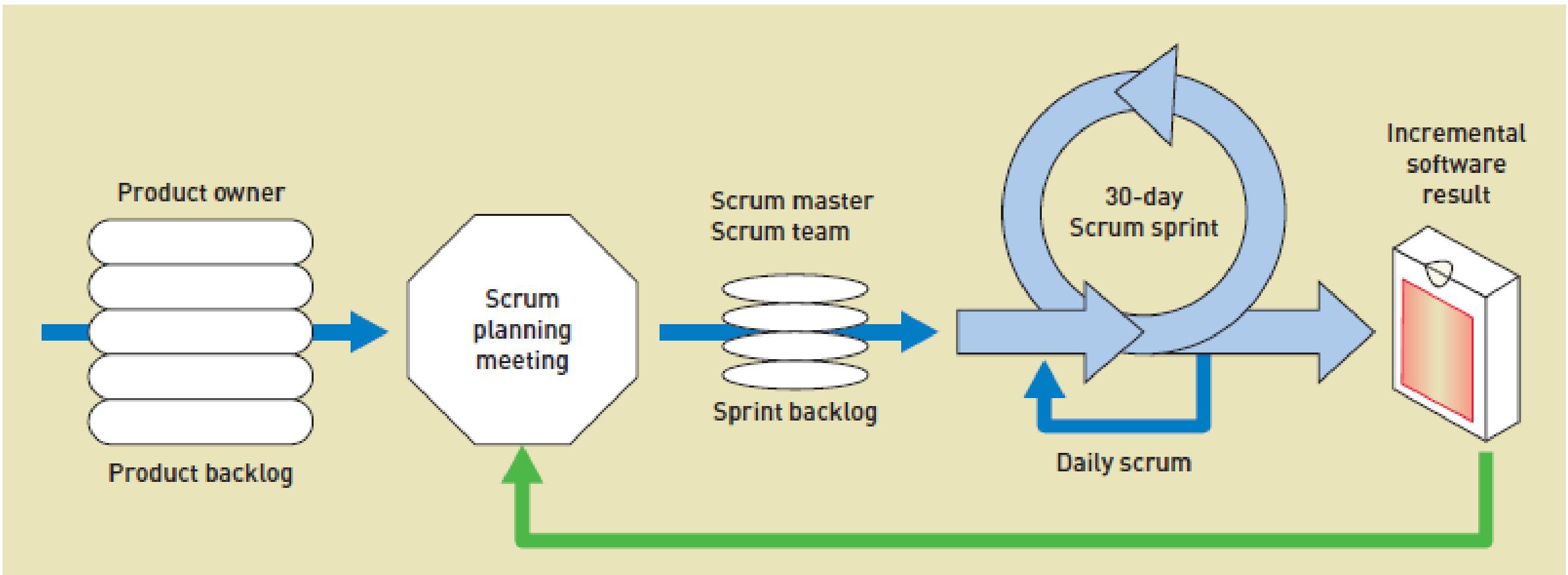
Scrum Organization

- Product backlog – a prioritized list of user requirements used to choose work to be done in a Scrum project
 - Only a few of the high-priority items are worked on at a time
- Product owner – the client stakeholder for whom the system is being built
 - Responsible for project backlog and priorities
- Scrum master – the person in charge of a Scrum project—similar to a project manager
- Scrum team is usually 5 to 9 people
- Scrum team sets own goals, organizes self, makes decisions

Scrum Practices

- Sprint – a time-controlled mini-project that implements a specific portion of a system
 - Firm 30 day time box with specific goal or deliverable
 - The scope of that sprint is then frozen, and no one can change it—neither the product owner nor any other users
 - Sprint backlog defines the scope
- Daily Scrum – a daily meeting of all members of the team to report progress (15 minutes max)
- Sprint final half-day review meeting – scheduled to review and identify changes needed for the following sprints

Scrum Development Process



Trends in Technology Infrastructure

- New Client Computing Devices and Applications –Small, mobile, connected
 - Device-top application – a computer application that is built to execute on a local device without requiring a client/server connection
 - Free-standing Internet application –a client/server application that is self-contained and doesn't require the use of a Web browser
 - Browser-based application –a client/server application that executes locally within the control of a Web browser

Trends in Technology Infrastructure

- Internet and Telephone Communications
 - Internet, the telephone, and television are merging
 - Long-distance telephone communication and long-distance Internet communication have very similar requirements and capability
 - Internet backbone – the primary data routes between large, strategically interconnected networks and routers on the Internet
 - Last mile – the final leg that delivers connectivity from the Internet network to the customer

Trends in Technology Infrastructure

- Back-End Computing –the server computers that provide the content—dynamic and static—for all applications that access servers through the Internet
 - As more and more client computers try to access a particular application, the workloads on the servers becomes incredibly heavy
 - Several factors are driving the need for large back-end computing services
 - Trend toward continuous connectivity to the Internet
 - Massive amount of data stored—many applications in the world of commerce keep a history of all the transactions that occur
 - The consolidation of processing in central locations

Data and programs are off the PC and back in massive data centers



Trends in Application Software Availability

- Software as a service (SAAS) – a software delivery model similar to a utility, in which the application and its associated data are accessed via the Internet without locally installed programs
- Open-source software – a method of developing, delivering, and licensing software that makes the application source code freely available to any interested developer or client

Owning Software vs. SAAS

Costs	Purchasing/owning software	SAAS
Software license	substantial	not required
Development or customizing	substantial	not required
Implementation and installation	substantial	not required
Usage fees	not required	as consumed or used
Configuration	not required	one time initialization
IT support staff	substantial	not required
Application support staff	substantial	not required
Training of users	required	required
Servers, networks, data storage	substantial	as consumed or used
Internet usage	required (possibly)	required

Open Source Software Applications

Category	Name	Description
Business	Open Office	Word processing, spreadsheets, presentations, drawing, and simple database functions
	Open Project	Project management
Databases	MySQL	Database management system
	PostgreSQL	Database management system
Development	Eclipse	Java-based IDE with toolkit
	NetBeans	Java-based IDE with toolkit
Graphics applications	GIMP	Graphics manipulation
	KToon	Vector animation toolkit
Security and privacy	GNU Privacy Guard	Encryption tool
	ClamWin	Antivirus program
Web development	Aptana Studio	Comprehensive Web-development IDE for Web languages
	SeaMonkey	Browser, e-mail, newsgroup, HTML-authoring tool
Servers/Internet	Unix	Operating system; several versions
	Apache	Web server and other similar projects
Internet applications	WordPress	Blog system
	phpBB	Bulletin board system
	Joomla	Content management system

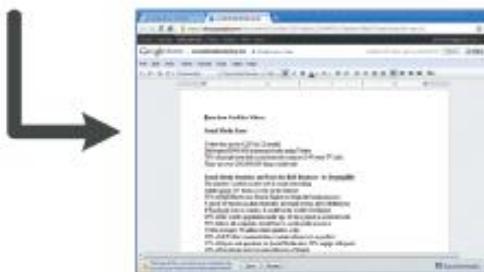
The Web as an Application Platform – The Evolution



- 1. Simple pages with text, static images, and links**
(e.g., httpd.apache.org)



- 2. Animated pages with media and plugins**
(e.g., www.imdb.com)



- 3. Rich Internet Applications with active user involvement**
(e.g., docs.google.com)

Courtesy of Apache, IMDB, and Google

The Web as an Application Platform

- Web 2.0 – a loosely defined, nonstandard term used to refer to Web sites that permit user-generated content and user interaction, such as social networking sites
- Plug-ins – a software component that adds specific capabilities to a larger software application
- Widget – a type of plug-in that focuses on enhancing the user interface with additional capability (also called gadget)
- Theme – a type of add-on to an application that allows the look and feel, such as colors and layout, to be changed

Sample Plug-ins for WordPress Blog

Plug-in name	Plug-in description
Ads Manager Plug-in	Quickly and easily inserts any ad code unit to your posts from Forum topics.
Akismet	Protects your blog from comment and trackback spam by accessing the Akismet database.
Artiss YouTube Embed	Embeds YouTube videos in your blog.
Awesome Flickr Gallery	Creates and customizes a gallery of your Flickr photos on your blog.
Fast Secure Contact Form	Easily configures and adds contact forms to your blog to allow users to send e-mails to the site administrator
Google Analytics Popular Posts	Uses Google Analytics API to fetch data from your analytics account and post it on your blog.
Social Sharing Toolkit	Enables sharing of your blog content via popular social networks.
What Others Are Saying	Uses the RSS field in your Blogroll to display the most recent post from sites that you link to.
WP to Twitter	Posts a Twitter status update from your blog.
WP Super Cache	Generates a static html file from your dynamic WordPress blog for faster service.

Sample Google Web Page Gadgets

Firefox - Google Gadgets For Your Webpage

https://www.google.com/ig/directory/synd:open&cat:tools

Search Google Gadgets

Results 1 - 24 of 9295 [more >](#)

Google Gadgets For Your Webpage

All News Tools Communication Fun & Games Finance Sports Lifestyle Technology New Stuff

Google Calendar Viewer Birthday Reminder GRE Word of the Day Data And Time EventID Search

Add to your webpage Add to your webpage Add to your webpage Add to your webpage Add to your webpage

Windows Shortcuts of the Day Tchibo - Jede Woche eine neue Tchibo Free Translation: ImTranslator DomainTyper Bandwidth Speed Test

Add to your webpage Add to your webpage Add to your webpage Add to your webpage Add to your webpage

Simply Calendar Travel Search Engine - Flig... abbot - Selections from Enc... Ebay Search Latest Bulls

Add to your webpage Add to your webpage Add to your webpage Add to your webpage Add to your webpage

Date & Time - Multi-Usage Visitor Worldmap Currency Converter Monis Visitor Tracking Weather Forecast from Goog...

Add to your webpage Add to your webpage Add to your webpage Add to your webpage Add to your webpage

ImTranslator Voice Locate IP Address Love Calculator GOOGLE MAP SEARCH

Add to your webpage Add to your webpage Add to your webpage Add to your webpage

Images 32/32 Loaded 52 KB Speed: 51.18 KB/s Time: 1.019

The screenshot shows a Firefox browser window displaying the Google Gadgets directory. The URL is https://www.google.com/ig/directory/synd:open&cat:tools. The page title is "Google Gadgets For Your Webpage". On the left, there's a sidebar with categories: All, News, Tools (which is selected), Communication, Fun & Games, Finance, Sports, Lifestyle, Technology, and New Stuff. The main content area displays a grid of 24 gadgets, each with a thumbnail, name, and an "Add to your webpage" button. The gadgets include: Google Calendar Viewer, Birthday Reminder, GRE Word of the Day, Data And Time, EventID Search, Windows Shortcuts of the Day, Tchibo - Jede Woche eine neue Tchibo, Free Translation: ImTranslator, DomainTyper, Bandwidth Speed Test, Simply Calendar, Travel Search Engine - Flig..., abbot - Selections from Enc..., Ebay Search, Latest Bulls, Date & Time - Multi-Usage, Visitor Worldmap, Currency Converter, Monis Visitor Tracking, Weather Forecast from Goog..., ImTranslator Voice, Locate IP Address, Love Calculator, and GOOGLE MAP SEARCH. At the bottom, it says "Images 32/32 Loaded 52 KB Speed: 51.18 KB/s Time: 1.019".

The Web as an Application Platform (continued)

- Toolbar – a type of add-on usually comprised of iconic menu items that access the capabilities of the application or plug-ins in a user-friendly fashion
- Web mini-app – a software application that provides a complete set of functions but that must be executed within the confines of another application
- Mashup – a type of Web site that combines the functionality of several other Web sites through the use of predefined APIs
- Rich Internet Applications (RIAs) –a type of Web site that provides active user interaction as well as delivers rich multimedia

Mashup of Several APIs to Create a Dashboard Page

The screenshot displays a custom dashboard page from Pageflakes. At the top, there's a search bar with 'Google' and links for 'Sign up | Log in | Reader | Make this my homepage'. A yellow 'menu' button is on the right. Below the header, a yellow banner says 'here to create a page personalized with your interests or to change your locations.' The dashboard features several modules:

- Weather:** Shows a 3-day forecast for San Francisco, CA, with icons for sun and clouds, temperatures (64°/53°F, 62°/54°F, 61°/56°F), and links to 'Hourly Forecast' and '10-Day Forecast'. It's powered by weather.com.
- News:** Headlines include 'Suspects charged in attacks on Bryan Stow, SF fans - S...' and 'San Francisco Giants open tough stretch with loss to Milwaukee...'. It also shows a photo of two men.
- Sponsored Content:** A video player for 'Harry Potter and the Deathly Hallows - Part 2: Clip - Is it love?'.
- Photos:** A large image of a city skyline at sunset over water.
- Twitter:** Recent public updates from users like 'LianePadilha', 'elocandid', 'matheusrm', 'HPCBR', and 'markpinho'.
- Mother of all podcast feeds:** A list of items including 'LaserDog&Pos', 'What Idols do you', 'AJ Wynn's', and 'PPL Radio Editur'.
- Task List:** A table with columns 'Due In' and 'Done?'. Tasks listed are 'Task 1', 'Task 2', and 'Task 3'.

Rich Internet Application (RIA)

The screenshot shows the Nike+ Dashboard application running in a web browser. The main visual is a 3D rendering of a female runner in mid-stride on a reflective surface. An iPhone is shown above her, connected by a red line, displaying a map of her run route. To the right, a large digital screen displays run statistics: 5.33mi, 8'33" pace, 0:44:37 time, and a play/pause button. Below the runner, a large orange banner reads "INSTANT, IN-RUN INFORMATION". At the bottom left, it says "Together, Nike+ ran 414,547,967 mi" with a large orange "Edit" button overlaid. On the bottom right, there's a "How to Get Started" section with steps 1. Get the Gear and 2. Connect & Run.

Loaded: 10 KB | Speed: 5.76 KB/s | Time: 1.844

Courtesy of nikerunning.nike.com

Rich Internet Application (RIA)

The screenshot shows a web browser window with multiple tabs open. The active tab is for MINIUSA.COM, displaying a landing page for Mini cars. The page features a large blue Mini Cooper car in the center. A navigation bar at the top includes links for LEARN, BUILD, SHOP, and PLAY. A dropdown menu under the BUILD link offers options like 'DESIGN & BUILD YOUR OWN MINI', 'RETRIEVE A SAVED MINI', and 'VISIT THE CUSTOM PAINT SHOP'. To the right, a sidebar titled 'STAY IN THE LOOP' lists various Mini models with corresponding images and links: HARDTOP (Cooper, Cooper S), CONVERTIBLE (Cooper, Cooper S), CLUBMAN (Cooper, Cooper S), COUNTRYMAN (Cooper, Cooper S, Cooper S ALL4), and JOHN COOPER WORKS (Hardtop, Convertible, Clubman). At the bottom of the page, there are links for MINI FINANCIAL SERVICES, ACCESSORIES, CONTACT & FAQ, PRIVACY & LEGAL, SITE MAP, MINI.COM, and OWNER RESOURCES.

Rich Internet Applications (RIAs)

- JavaScript and Ajax Libraries
 - De facto standard for adding desktop-like computing within browsers
- ICEFaces and JavaFX
 - Open-source framework that provides Java language APIs to build and deploy server-based RIAs
- Adobe Flash Platform
 - Best known as a multimedia platform for animation and interactivity
- Microsoft Silverlight
 - Microsoft's Windows Communication Foundation (WCF) .NET RIA Services to support the development and deployment of RIAs
- HTML5
 - New HTML specification that standardizes RIA specifications for built-in browser delivery

