

Open Development

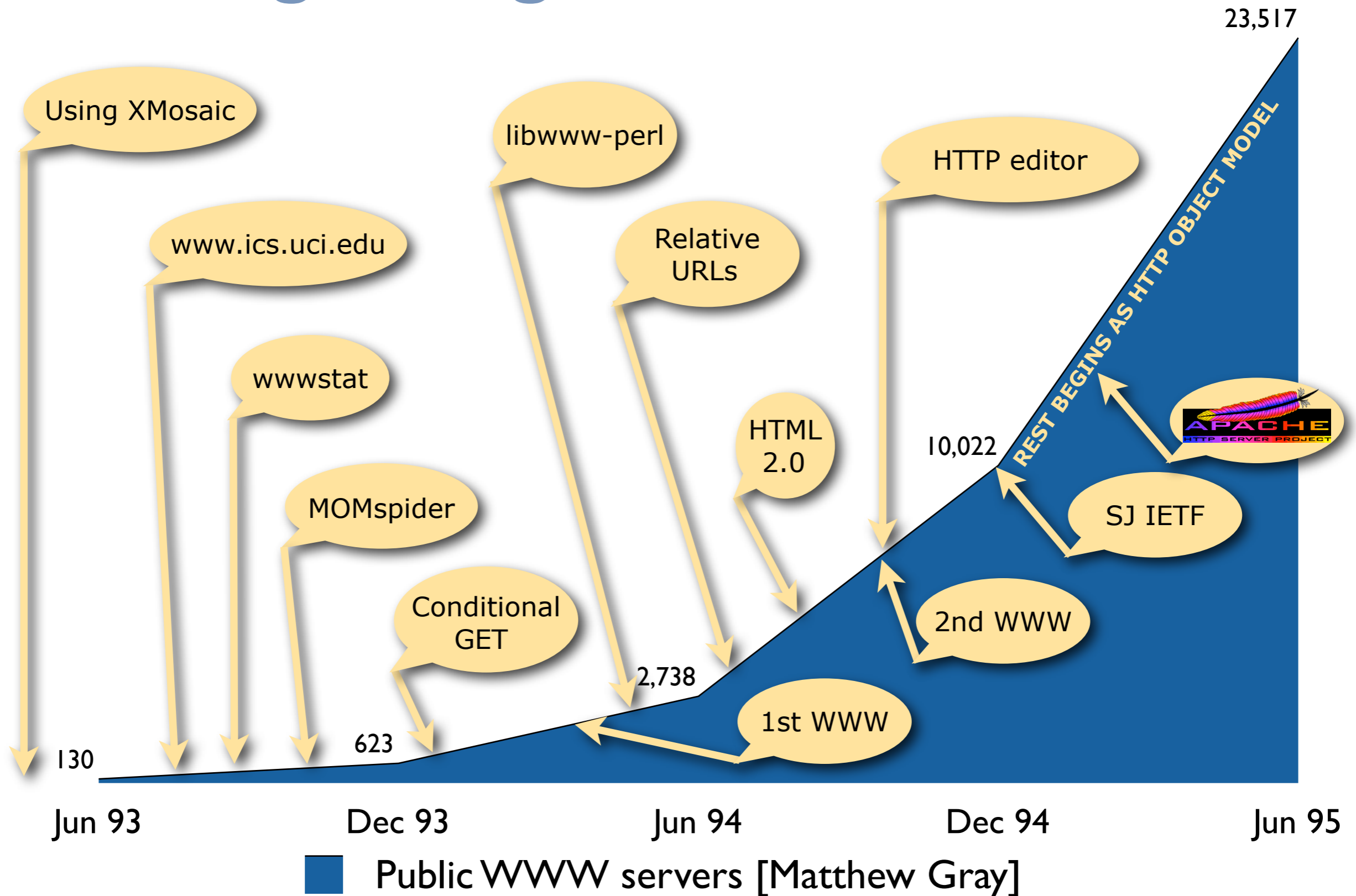
Roy T. Fielding, Ph.D.

Chief Scientist, Day Software

fielding@day.com

In the beginning ...

Aug '10 = 213,458,815 (9077x)



Overview

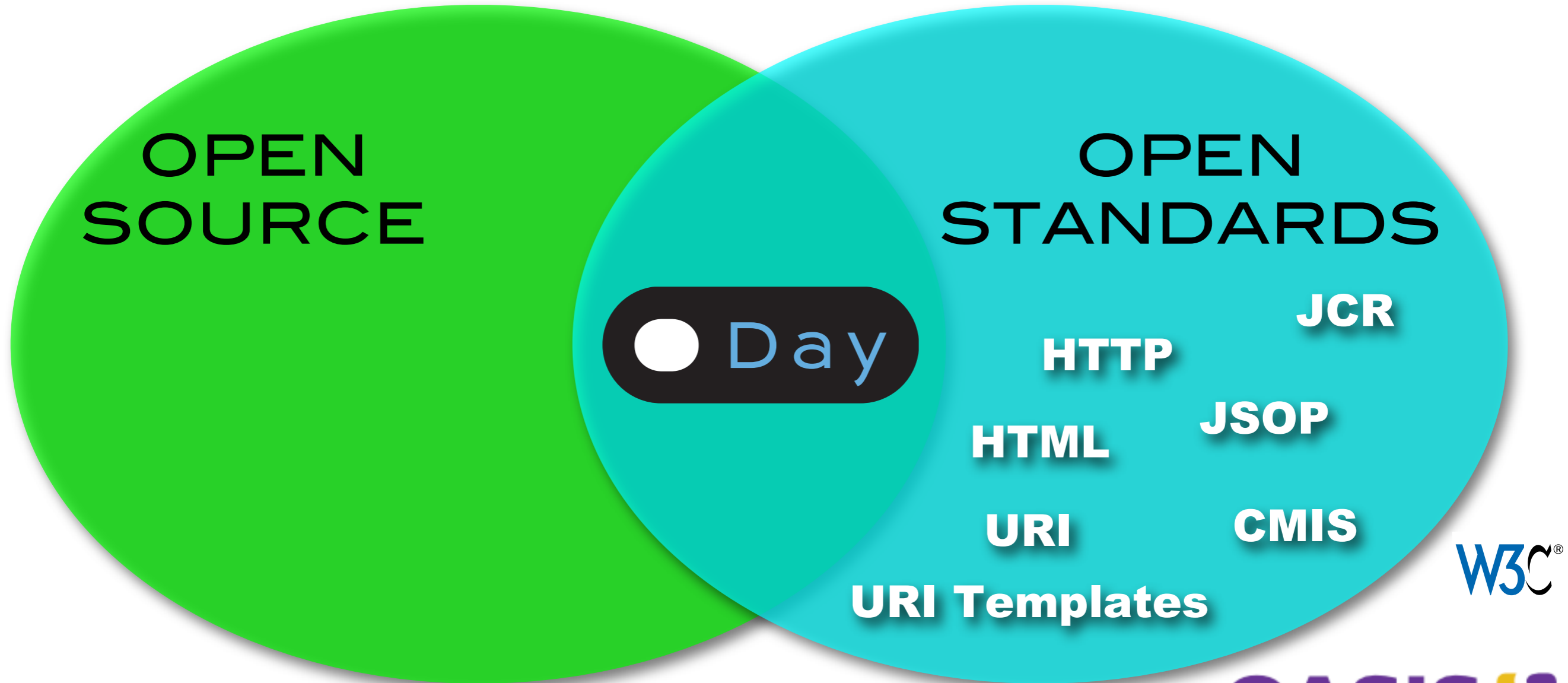


OPEN
SOURCE

○ Day



Overview



W3C[®]

OASIS

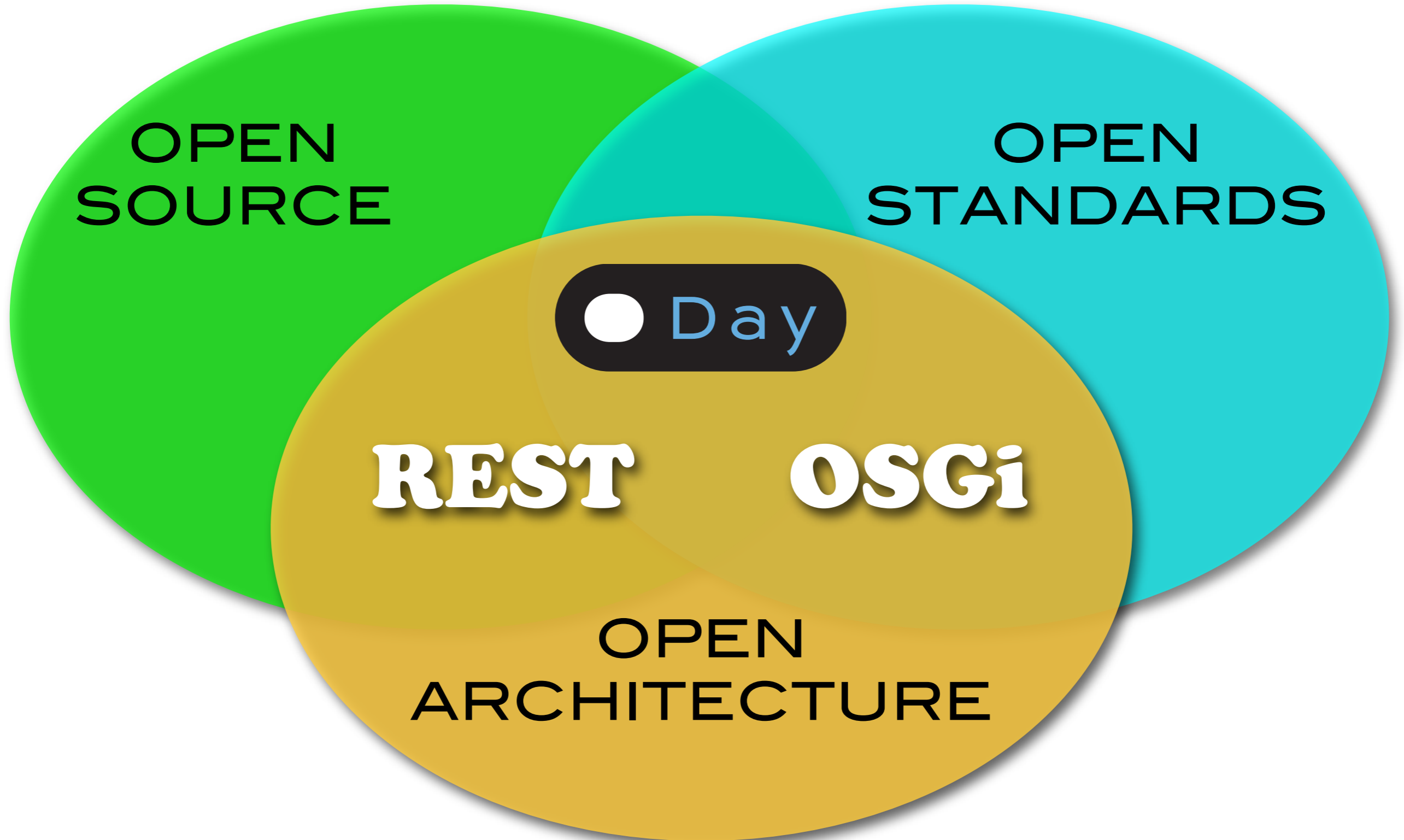


I E T F[®]



Java
Community
Process

Overview



Open Development



OPEN
SOURCE

○ Day



Let's talk about...

The ASF structure

How Day works with the ASF

How the ASF works with Day

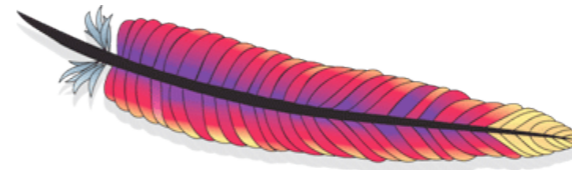
What the benefits are for both

[Slides originally from Bertrand Delacrétaiz]

It's all about

Collaboration

The ASF in 2010



84 projects (+ 36 incubating)

> 2359 committers

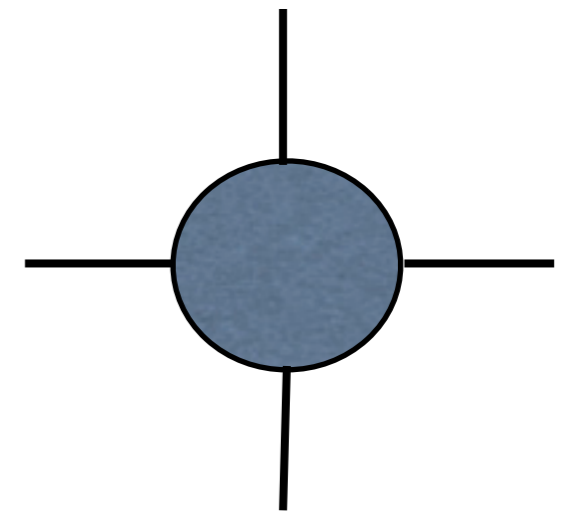
ASF members: 330

3 TB/day www traffic

No offices

almost no f2f meetings

all decisions on mailing lists



Hundreds of releases

The ASF backbone?



revision control system



blogs



IRC



issue tracker



mailing lists + archives



Instant messaging



Wikis

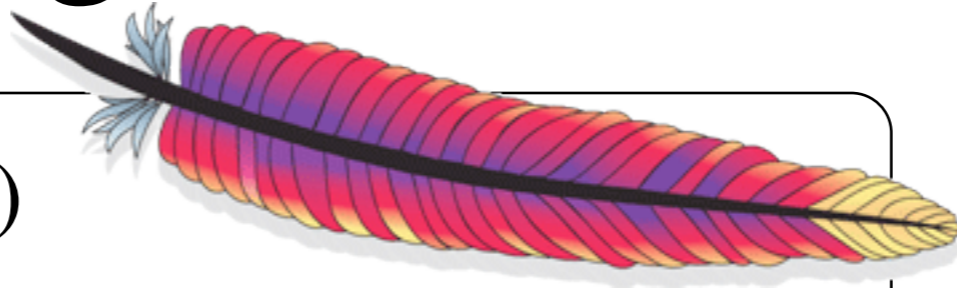


httpd (of course)



automated builds

ASF structure



Contributors (thousands)

Committers (~2360)

PMC members
(~800?)

ASF members
(~330)

Board of
directors (9)

Officers

Legal
advisors

Contracted
personnel (3)

Sponsors

Collaboration

but how?

Collaboration



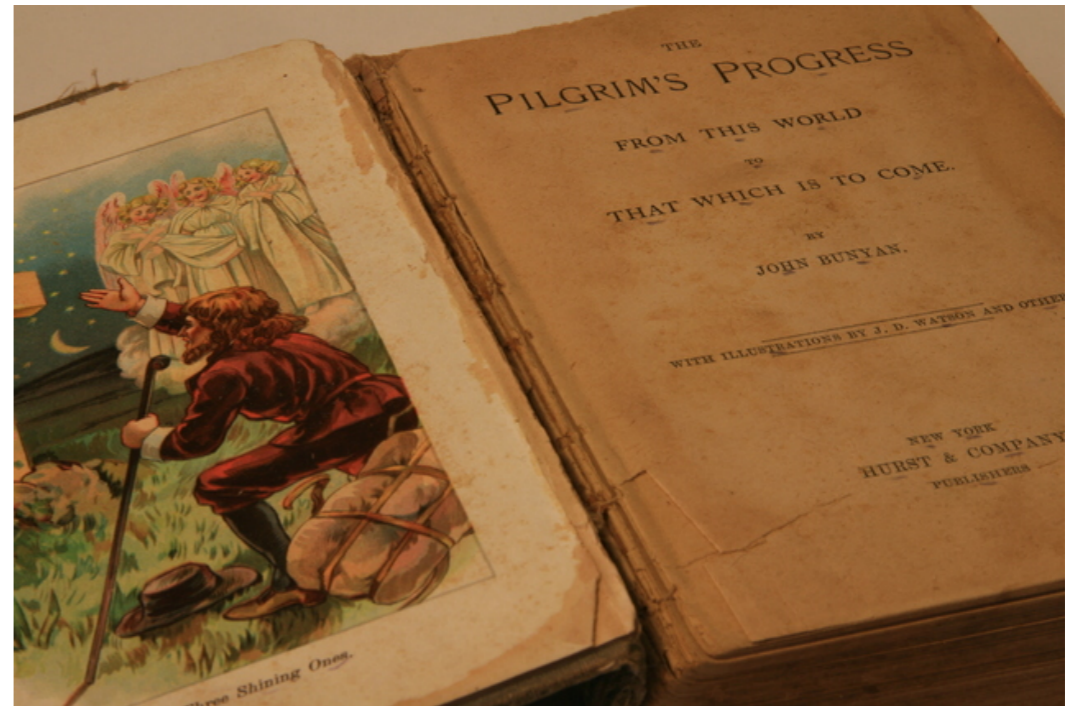
Shared vision



Real-time updates



Real-time help requests

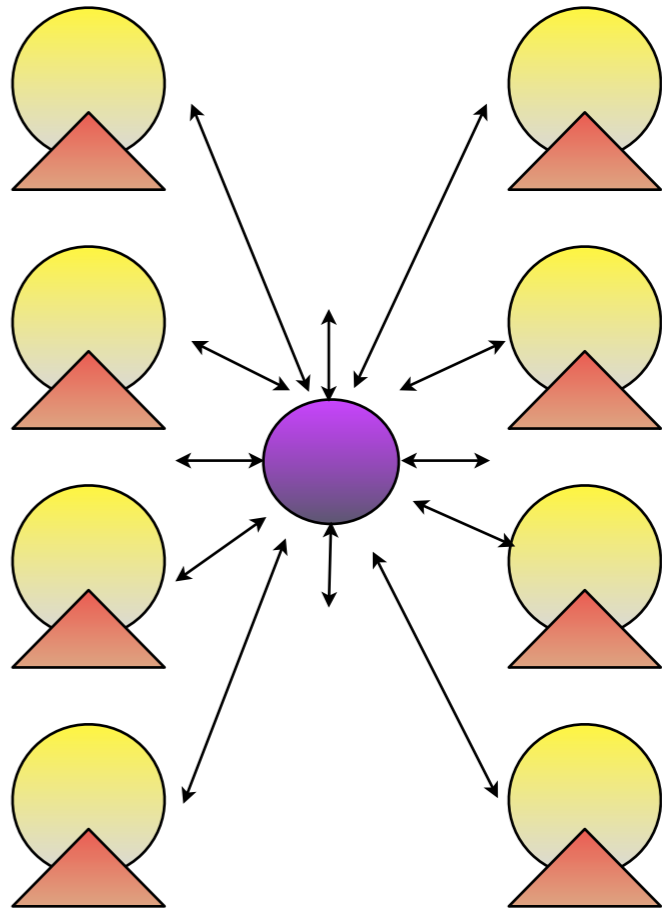
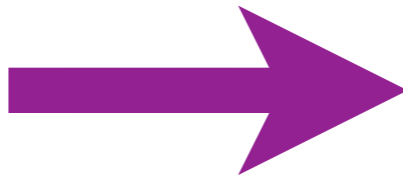
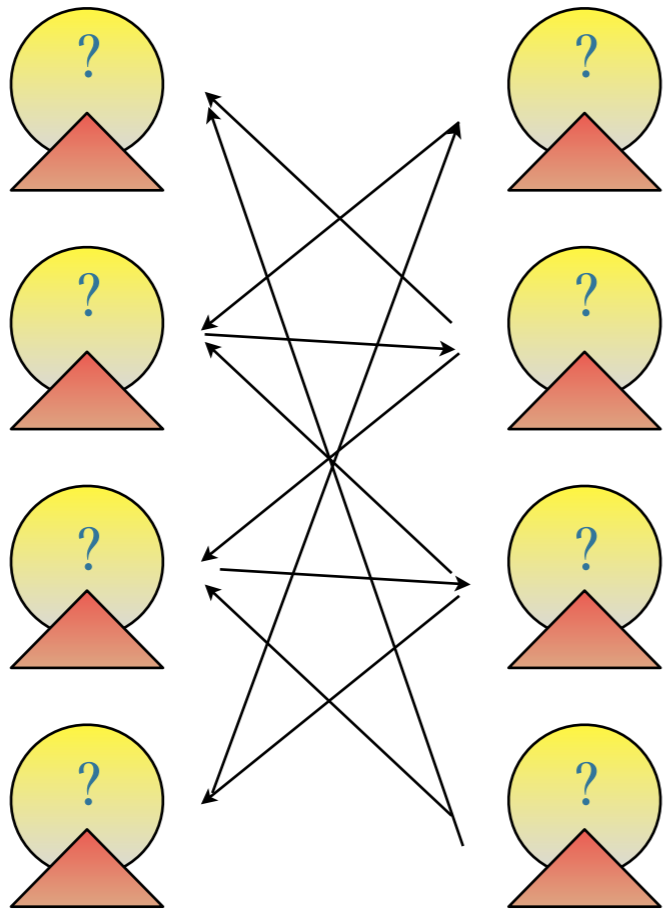


Self-service archives



Sharing the Vision

Sharing the vision?



Mess Media?
oral tradition?

Central Hub
permanent record

Sharing the vision.

verba volant, scripta manent...



mailing lists + archives

Searchable mailing lists
instead of 1-to-1 email



Wikis

Wikis instead of email
attachments



blogs

Blogs help for out-of-
band conversations

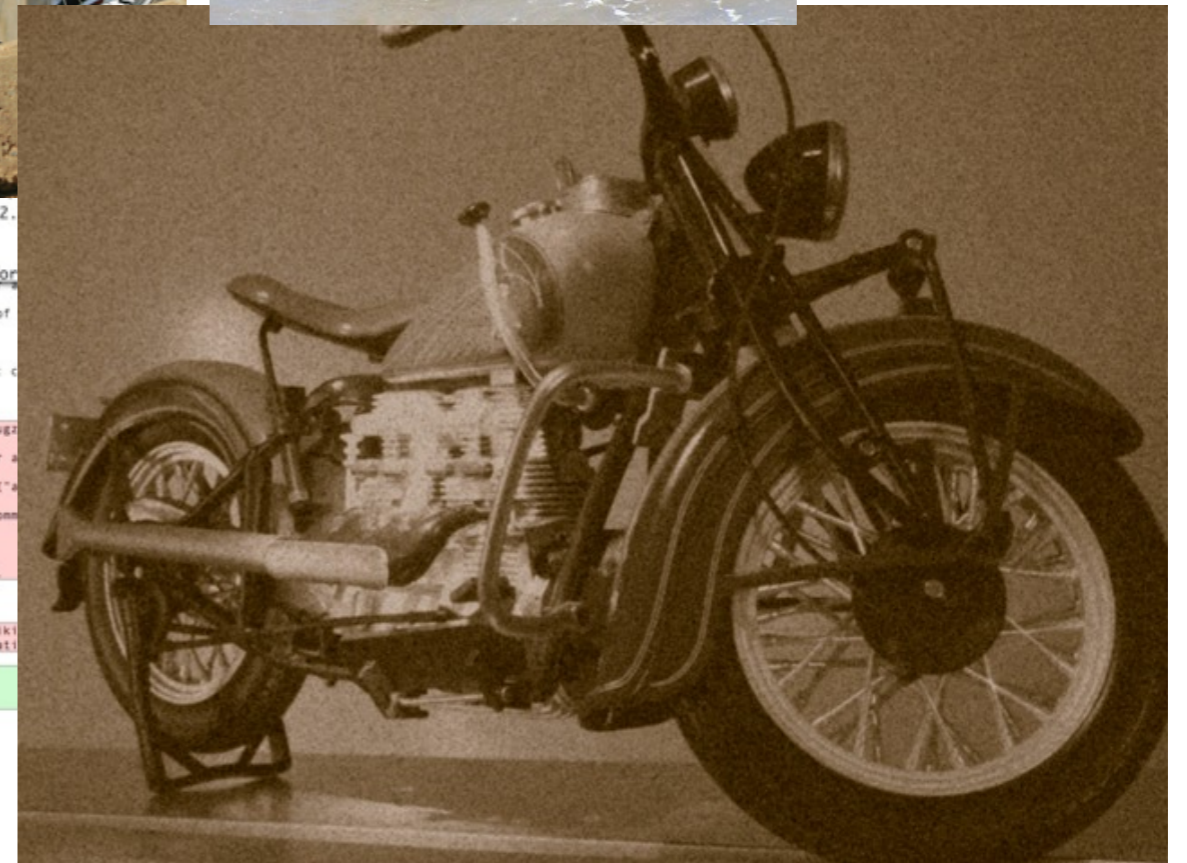


Real-time updates

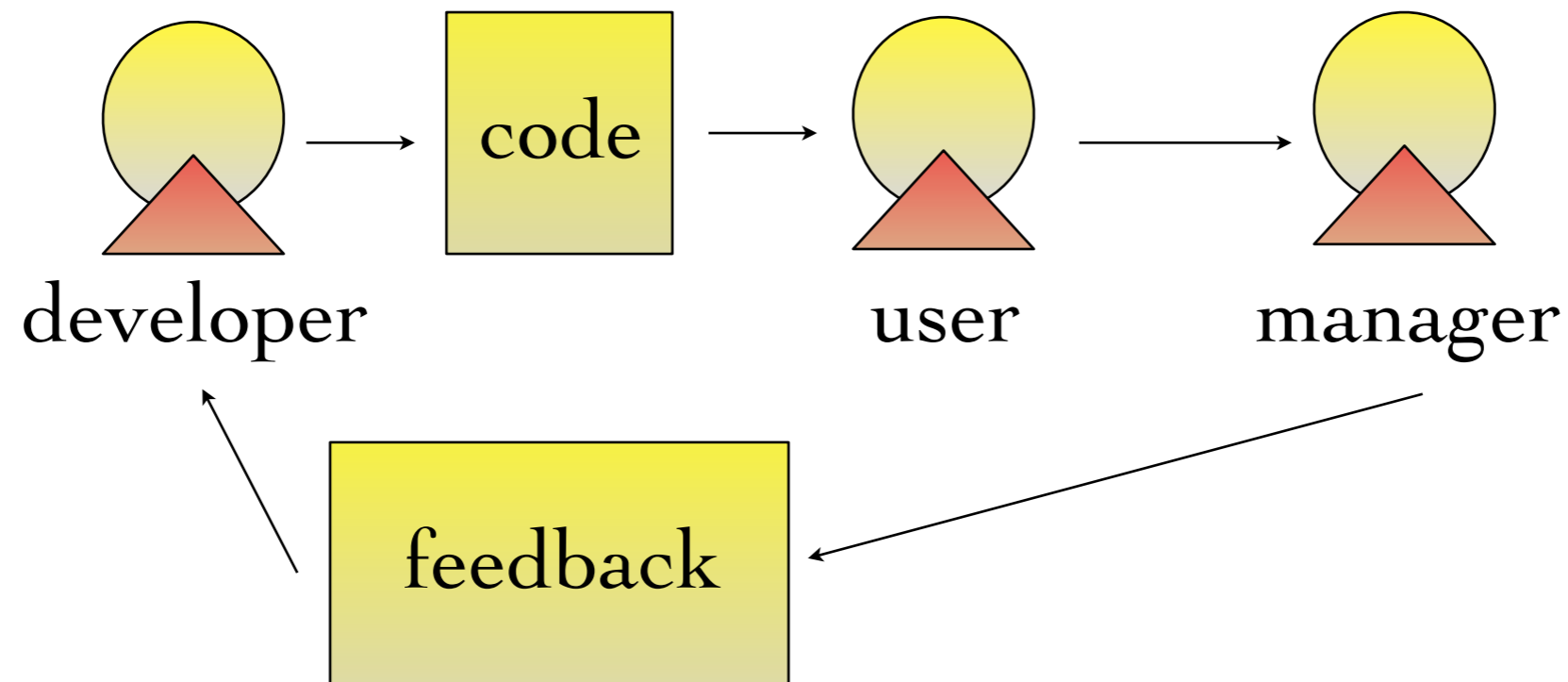
We need fast feedback!



```
Working file: status.xml 1.155 (antonio 25-Sep-03): Update lib commons-lang to 2.
head: 1.158 1.154 (antonio 25-Sep-03): </action>
----- 1.151 (sylvain 24-Sep-03): <action dev="SW" type="add">
revision 1.158 1.151 (sylvain 24-Sep-03): New event-handling system for
date: 2003/09/28 05:01:05; author: a
Update status.xml
-----
revision 1.157
date: 2003/09/26 14:46:23; author: b
YAPT presentation tool sample added
-----
revision 1.156
date: 2003/09/25 16:57:44; author: c
<action dev="CZ" type="add" fixes-
services.com">
Fixing release of Source in the
-----
lide: Part One: Tools 46
-int-style: LittleText 47
48
49
lide: CVS 50
ote: User view of these toc 51
52
53
54
000 screenshots: commit/mer 55
56
lide: Bugzilla 57
58
000 screenshots: task list 59
60
lide: Wiki 61
62
000 screenshots: Wiki link 63
64
65
66
lide: Weblogs 67
68
000 screenshots: stories, i 69
70
71
lide: Part Two: analysis 72
-int-style: LittleText 73
74
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99
```

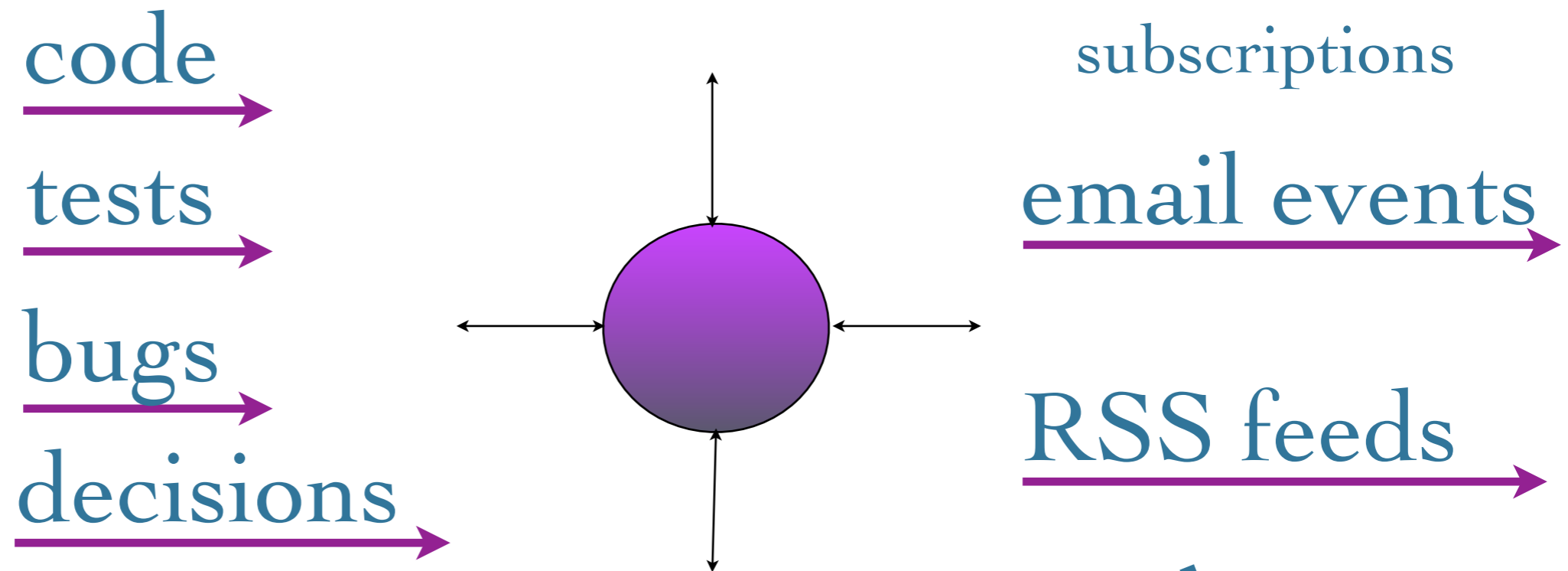


Feedback loop



How fast is your loop?
Seconds? Weeks?

Real-time updates?



Collaboration hub!

Real-time updates



Source code control system instead of “code on the fileserver”.



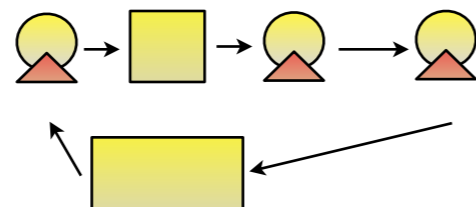
Issue tracker events instead of “what did you do today”?



Mailing list “events” instead of “yell around the office”.



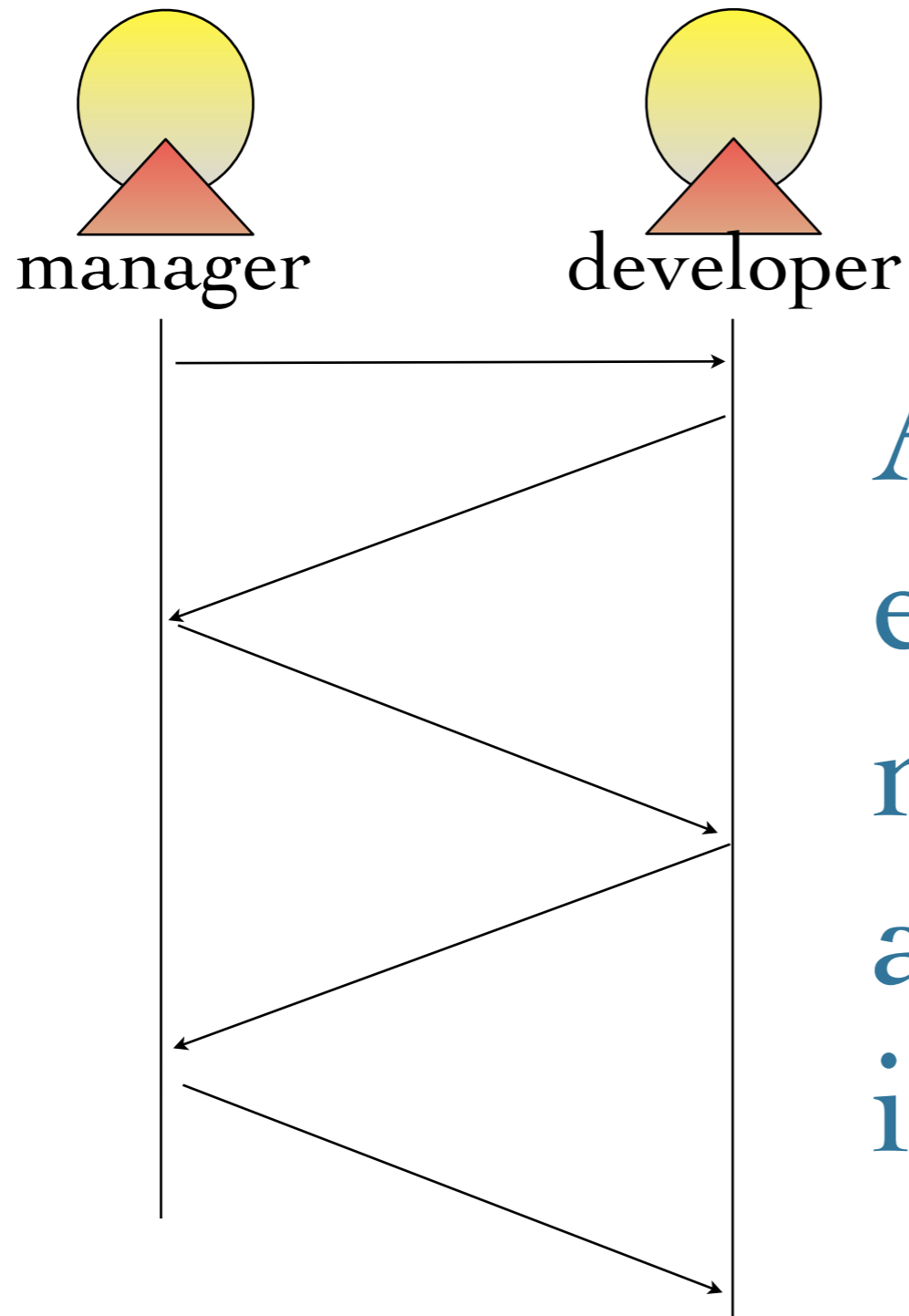
Automated builds instead of “wait for Bob to build it on Linux”.





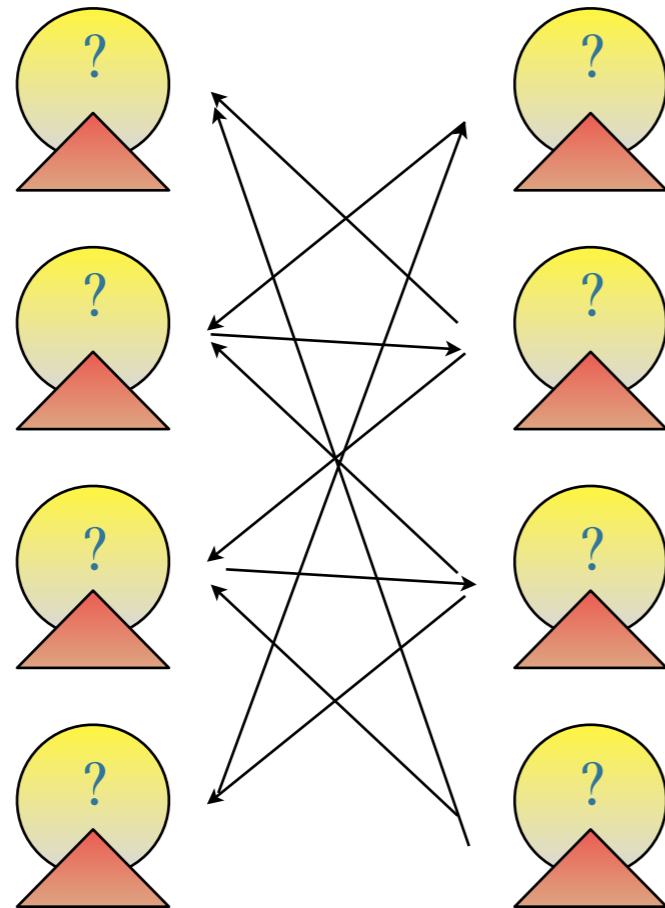
Real-time help requests

Real-time help requests?

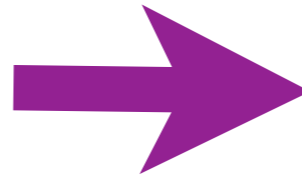


A help (feature, enhancement) request is a dialog, and history is important.

Real-time help requests



Mess Media?



Issue Navigator

Displaying issues 1 to 50 of 51 matching issues.

Current View:
Browser ([Current Fields](#) | [Printable](#) | [Full Content](#)) | [XML](#) | [RSS](#) ([Issues](#) | [Comments](#)) | [Word](#) | [Excel](#) ([All fields](#) | [Current fields](#)) | [Charts](#)

Bulk Change: [all 51 issue fields](#) | [Configure](#) your Issue Nav

1 | 2 | [Next >>](#)

| T | Key | Summary | Assignee | Reporter | Pr | Status | Res |
|---|---------------------------|---|-------------------|-------------------|----|--------|------------|
| | SLING-7 | Implement better Node Type Management | Unassigned | Felix Meschberger | ↑ | Open | UNRESOLVED |
| | SLING-3 | Use RequestProgressTracker to log request processing steps | Unassigned | Felix Meschberger | ↑ | Open | UNRESOLVED |
| | SLING-53 | Add request filter for method overwrite | Unassigned | Felix Meschberger | ↑ | Open | UNRESOLVED |
| | SLING-77 | Provide an easy-to-use Javascript API for JCR | Unassigned | Lars Trierloff | ↑ | Open | UNRESOLVED |
| | SLING-147 | Add support for org.osgi.framework.system.packages enhancement | Unassigned | Felix Meschberger | ↑ | Open | UNRESOLVED |
| | SLING-156 | JSTL Bundle | Unassigned | Carsten Ziegeler | ↑ | Open | UNRESOLVED |
| | SLING-166 | JavaScript: Enable request processing limitation | Unassigned | Felix Meschberger | ↑ | Open | UNRESOLVED |
| | SLING-160 | Group bundles by symbolic name rather than by bundle id. | Unassigned | Tobias Bocanegra | ↑ | Open | UNRESOLVED |
| | SLING-190 | The Sling class of the launcher should verify minimum JDK requirement and fail properly | Felix Meschberger | Felix Meschberger | ↑ | Open | UNRESOLVED |
| | SLING-196 | allow custom handlers in repository loader | Unassigned | Tobias Bocanegra | ↑ | Open | UNRESOLVED |
| | SLING-199 | Implement Request Filter management in the virtual resource tree | Unassigned | Felix Meschberger | ↑ | Open | UNRESOLVED |
| | SLING-247 | Provide Scripting variables as request attributes for JSP | Unassigned | Felix Meschberger | ↑ | Open | UNRESOLVED |
| | SLING-245 | After reinstalling sling core, server shutdown hangs | Unassigned | Tobias Bocanegra | ↑ | Open | UNRESOLVED |
| | SLING-81 | SLING-77 ↳ Add write-support to Javascript API for JCR | Unassigned | Lars Trierloff | ↑ | Open | UNRESOLVED |
| | SLING-249 | Allow mapping nodes to internet domains | Unassigned | Vidar S. Ramdal | ↑ | Open | UNRESOLVED |
| | SLING-251 | Add mapping for user homes | Unassigned | Tobias Bocanegra | ↑ | Open | UNRESOLVED |
| | SLING-266 | Replace old JSON content import by new importer | Unassigned | Felix Meschberger | ↑ | Open | UNRESOLVED |
| | SLING-284 | Use bundle context of scripts for service locator aka sling script helper | Unassigned | Carsten Ziegeler | ↑ | Open | UNRESOLVED |

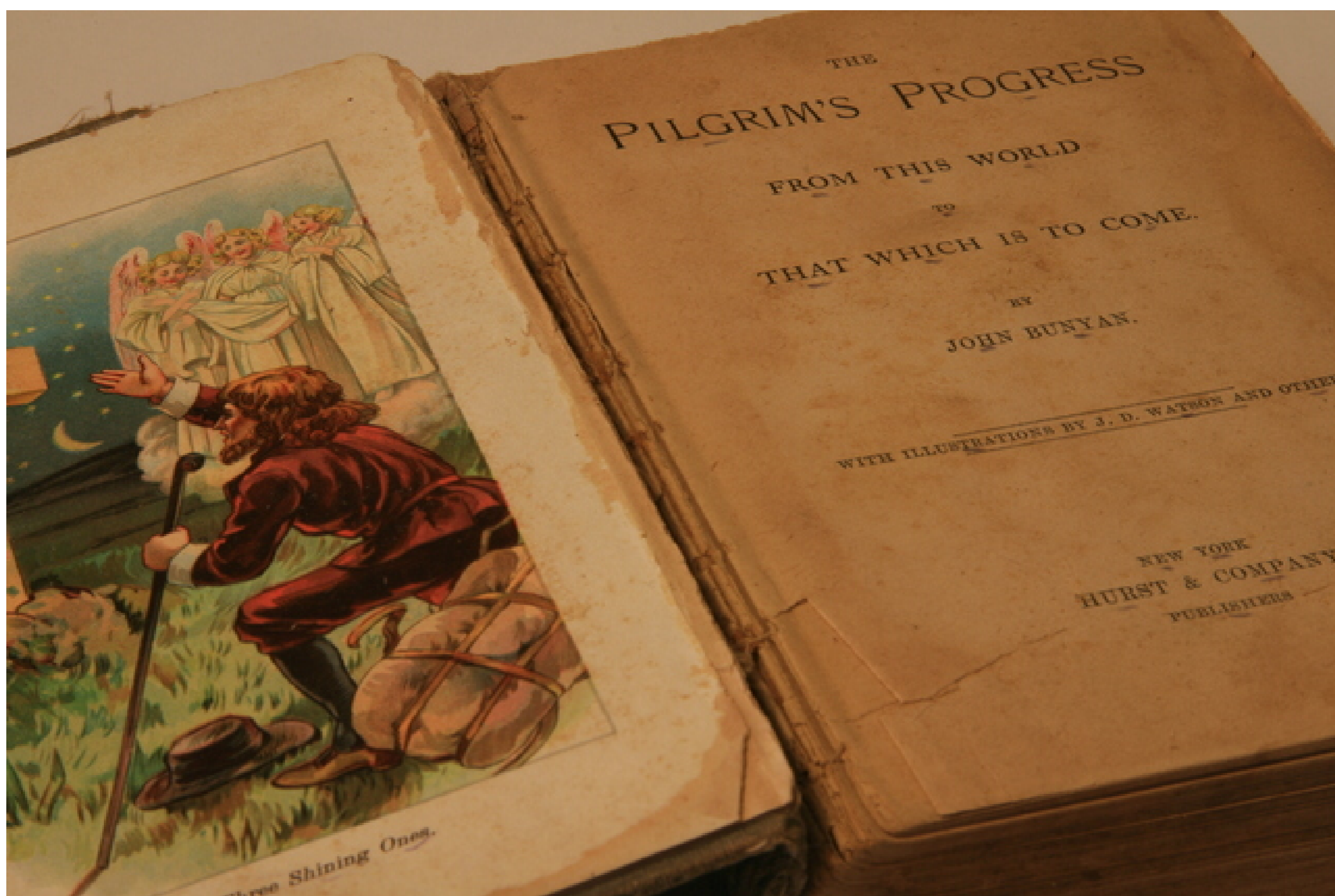
Issue Tracking

Real-time help requests



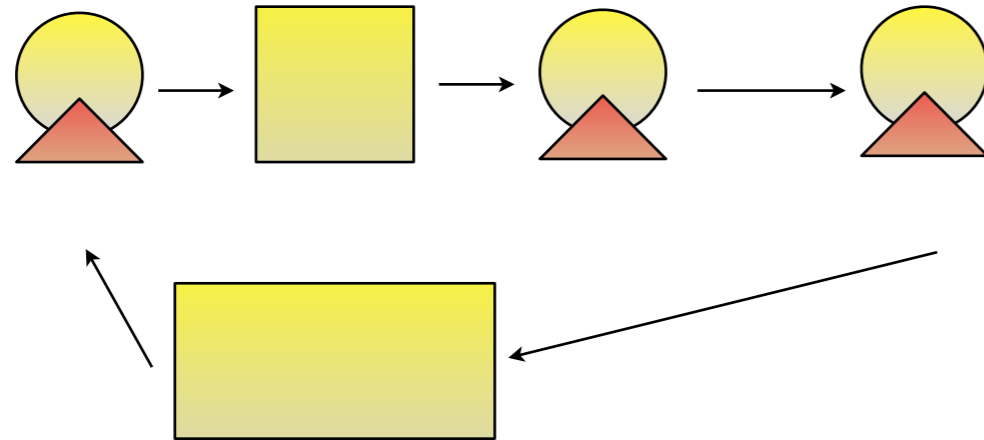
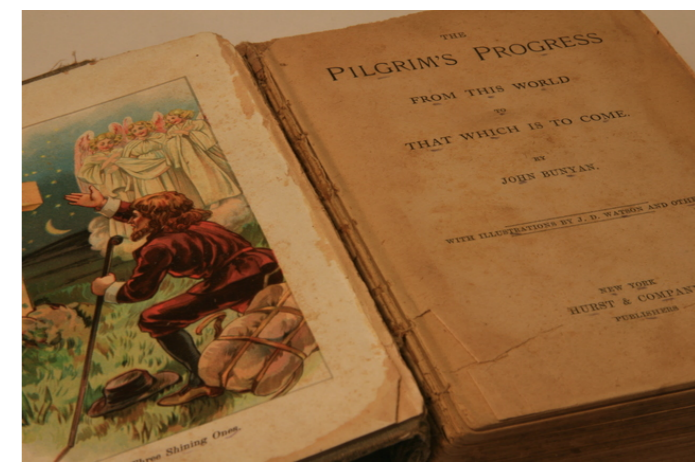
issue tracker

Issue tracker instead of
“just ask Bob to fix
this”.



Self-service archives

Self-service archives?

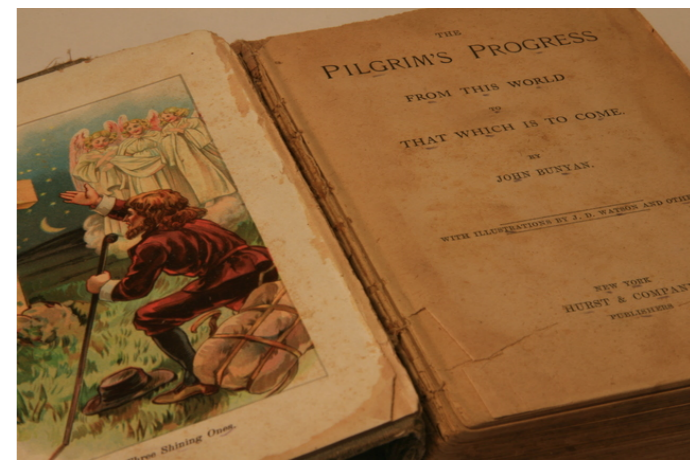


No time to document everything that happens.



But new project members need the information, self-service.

Self-service archives



Subversion logs, traceability of code.



Structured and searchable issue tracker data.



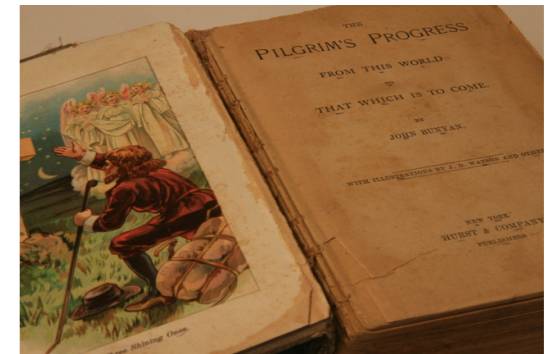
Semi-structured and searchable mailing lists.



Blogs and Wikis stay around.

Zero effort if using the rights tools!

Are We There Yet?



Collaboooration



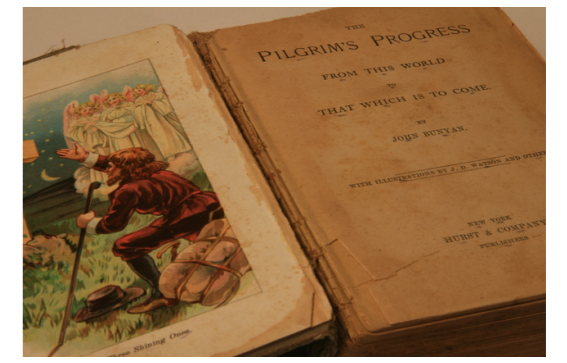
Vision



Updates



Help



Archives



Extra tools:



Day and the ASF



Apache **Jackrabbit**

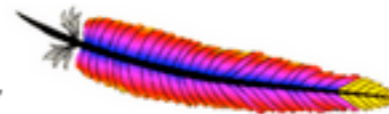
alexkli, angela, dpfister, fielding [*], fmeschbe, jukka, mreutegg, ppiégaze, stefan, tripod, uncled



bdelacretaz [*], cziegeler, fmeschbe



Apache Tika



Committers, PMC members and mentors on these projects, and others

[*] member of the Board of Directors

What does Day get out of this?



Great infrastructure software.
Many eyeballs.



Industry recognition (+ JSR-170)



Credibility with world-class people.

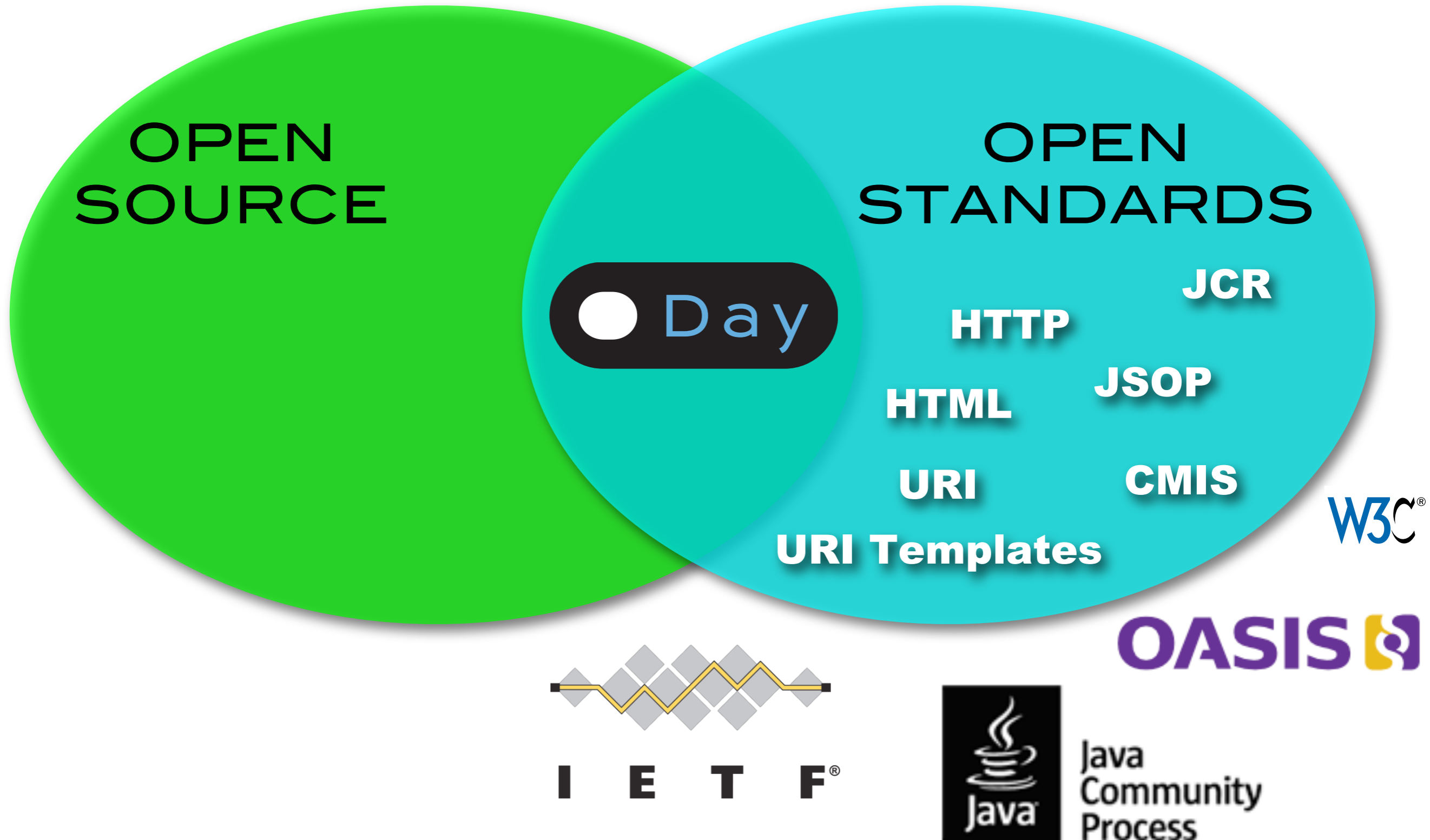


The Open Source way of working.
Works inside the company as well.

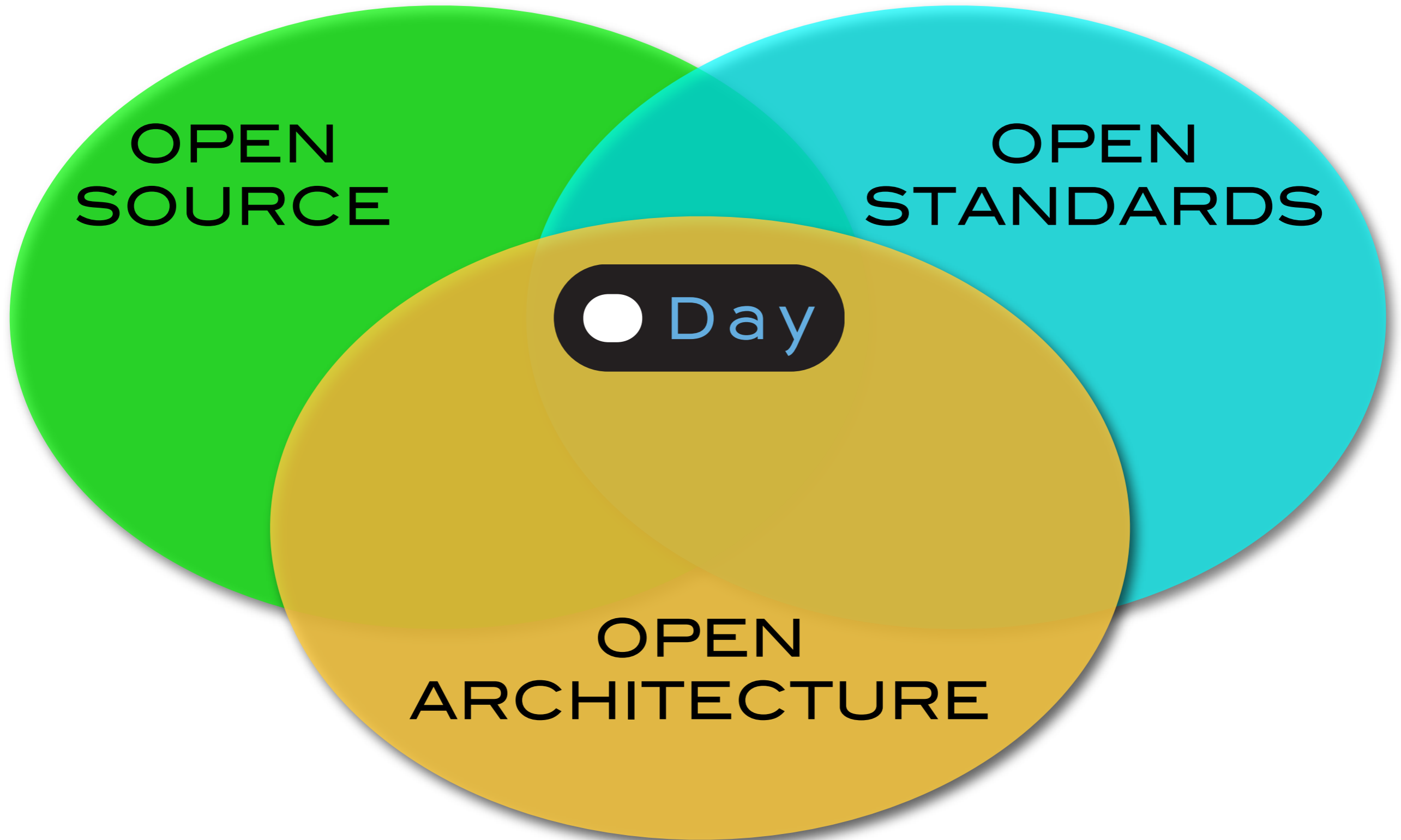


Contacts. Networks. Ideas.

Open Development: Standards

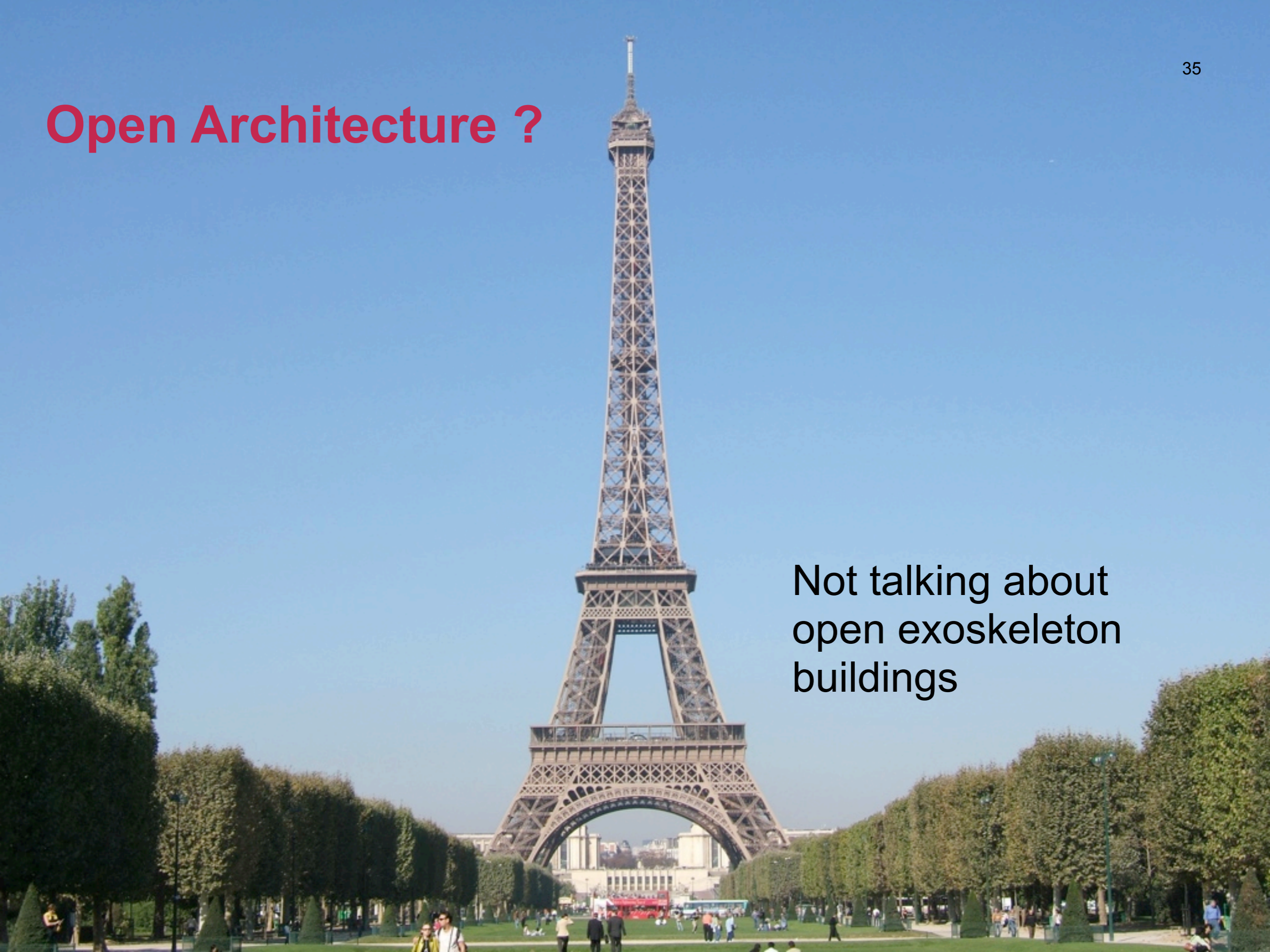


Open Development: Architecture



Open Architecture ?

Not talking about
open exoskeleton
buildings



Open Architecture ?

Not talking about Open Sourced Architecture

Find Current Projects | Open Architecture Network

http://www.openarchitecturenetwork.org/projects

Open Architecture Network beta 0.2

Register or Log in

Search

Welcome, guest: please register or log in to your account!

ABOUT

PROJECTS

COMPETITIONS

PEOPLE

RESOURCES

Find Current Projects

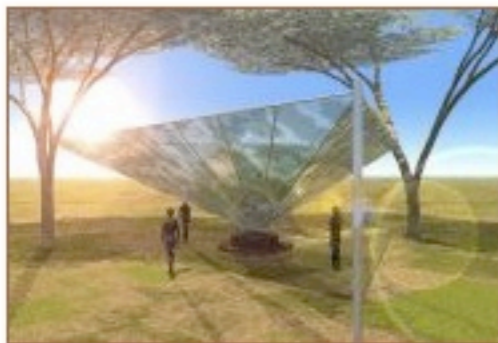
Start a Project

By Attributes

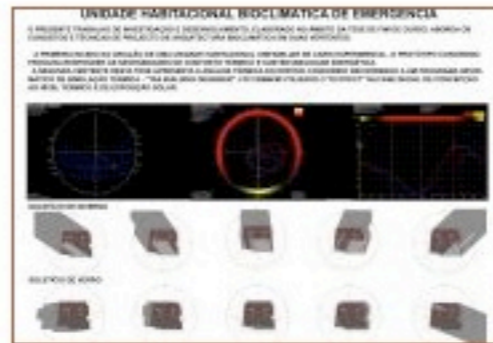
Search by keyword or use the Filter Criteria Search tools to narrow down your results.

1081 total projects.

Sort by: Overall Rating



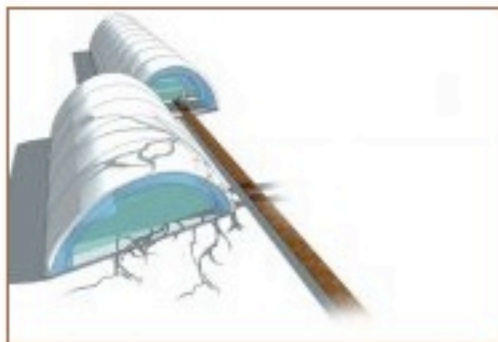
WatAir



Bioclimatic Shelter



Navajo Elder Straw Bale....



Beehive House



Expand on Soccer



1052 Kallari

SEARCH PROJECTS

Enter a keyword, i.e. "Cob" or "Straw"

FILTER CRITERIA SEARCH

STATUS

- All Statuses (1081)
- Design development (1212)
- Design complete (92)
- In construction (54)
- Construction complete (95)

REGION

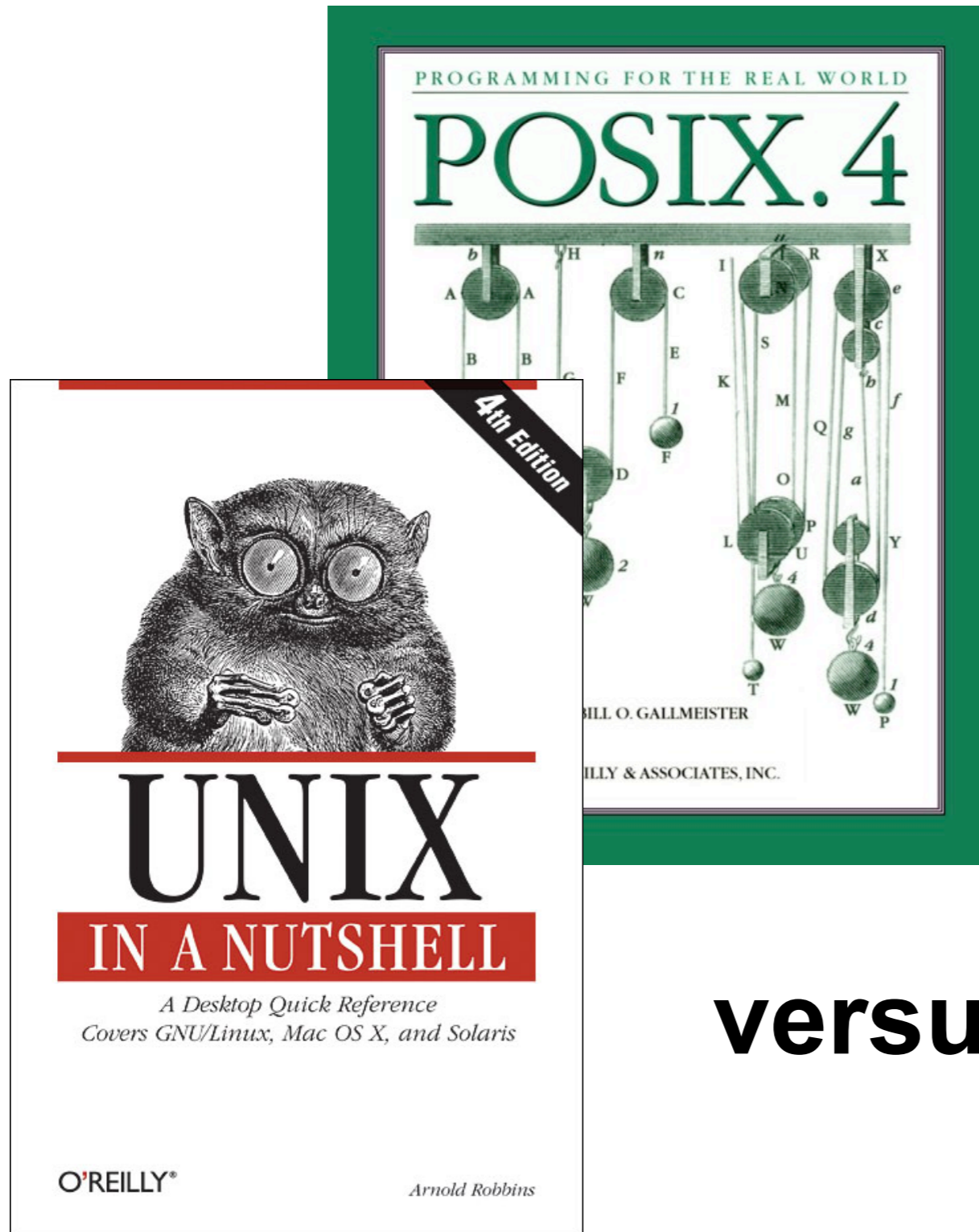
- All Regions (1081)
- Africa & Arab States (190)
- Asia & Pacific (175)
- Europe & Former Soviet States (37)
- Latin America & the Caribbean (110)

Open Architecture ?



Not even talking about personal computer open architecture

Open Architecture ?



Mainly talking about
**design for
open systems**

versus



Why talk about Open Architecture?

Open Development

Collaborative open source development

- > emphasizes **community**
- > takes advantage of the **scalability** obtainable through Internet-based virtual organizations
- > **adapts** to the volunteer nature of developers

Why talk about Open Architecture?

Open Development + Conway's Law

Any organization that designs a system (defined broadly) will produce a design whose structure is a copy of the organization's communication structure.

Melvin E. Conway, *Datamation*, April 1968

<http://www.melconway.com/law/index.html>

Why talk about Open Architecture?

**Open Development
+
Conway's Law**

**True open development
(a.k.a, Community-driven Design)
will only occur when the design of
your system reflects the organizational
structure of open development!**

Why talk about Open Architecture?

Open Development
+
Conway's Law
+
Change is inevitable!

**Decentralized Software Evolution
(or rapid obsolescence)**

Decentralized Software Evolution

Requires Architecture by Design

open (software) architecture

used by open development projects

to enable decentralized software evolution

so that others can continue to design the software

and fulfill Conway's Law

leading to success over time!

Challenges

Trade-off between Adaptability and Consistency

- ▶ what changes are possible?
- ▶ what assurances are provided?

Where to place the open points

- ▶ behavioral junctions (APIs, callback hooks)
- ▶ virtual machines (command tables, scripting)
- ▶ data flow (filters, plug-ins)

Consistency

- ▶ independent third-parties may change the application in incompatible ways

Closed Source Examples

Adobe

- ▶ extensive plug-in architecture
- ▶ diverse commercial community

The screenshot shows a web browser window with the title 'Products - Third Party Plug-ins for Adobe Applications'. The page features a navigation bar with links for 'Your account', 'Contact', 'United States (Change)', 'Home', 'Solutions', 'Products', 'Support', 'Communities', 'Company', 'Downloads', and 'Store'. A search bar is located on the right side of the navigation bar. The main content area is titled 'Third Party Plug-ins' and includes a 'PRODUCTS' dropdown menu. The text describes plug-ins as software modules that enhance and extend creativity and productivity within Adobe's applications. It lists several Adobe products that support plug-ins: Adobe Acrobat, Adobe After Effects, Adobe Illustrator, Adobe InDesign, Adobe PageMaker, Adobe Photoshop, and Adobe Premiere. The footer contains links for 'Company', 'Online Privacy Policy', 'Terms of Use', 'Contact us', 'Accessibility', 'Report piracy', 'Permissions and trademarks', 'Product license agreements', and 'Send feedback'. Copyright information for 2008 Adobe Systems Incorporated is also present, along with a TRUSTe EU SAFE HARBOR logo.

Products - Third Party Plug-ins for Adobe Applications

Your account | Contact | United States (Change)

Home Solutions Products Support Communities Company Downloads Store

Search Adobe.com...

Third Party Plug-ins

PRODUCTS ▼

Plug-ins are software modules that enhance and extend your creativity and productivity directly from within Adobe's applications. To automate or customize your workflow, add professional effects or to simply work faster and easier, just plug in! Add even more capability to your Adobe software with some extraordinary plug-ins available from third-party developers.

- ▶ Adobe Acrobat
- ▶ Adobe After Effects
- ▶ Adobe Illustrator
- ▶ Adobe InDesign
- ▶ Adobe PageMaker
- ▶ Adobe Photoshop
- ▶ Adobe Premiere

Company | Online Privacy Policy | Terms of Use | Contact us | Accessibility | Report piracy | Permissions and trademarks | Product license agreements

Send feedback

Copyright © 2008 Adobe Systems Incorporated. All rights reserved.
Use of this website signifies your agreement to the Terms of Use and Online Privacy Policy (updated 07-08-2008).

TRUSTe
EU SAFE HARBOR

Closed Source Examples

Apple iPhone Ecosystem



Open Development and Open Source

What is common to all of the largest and most successful open source projects?

a software architecture

designed to promote anarchic collaboration

through extensions

while preserving control over the core interfaces

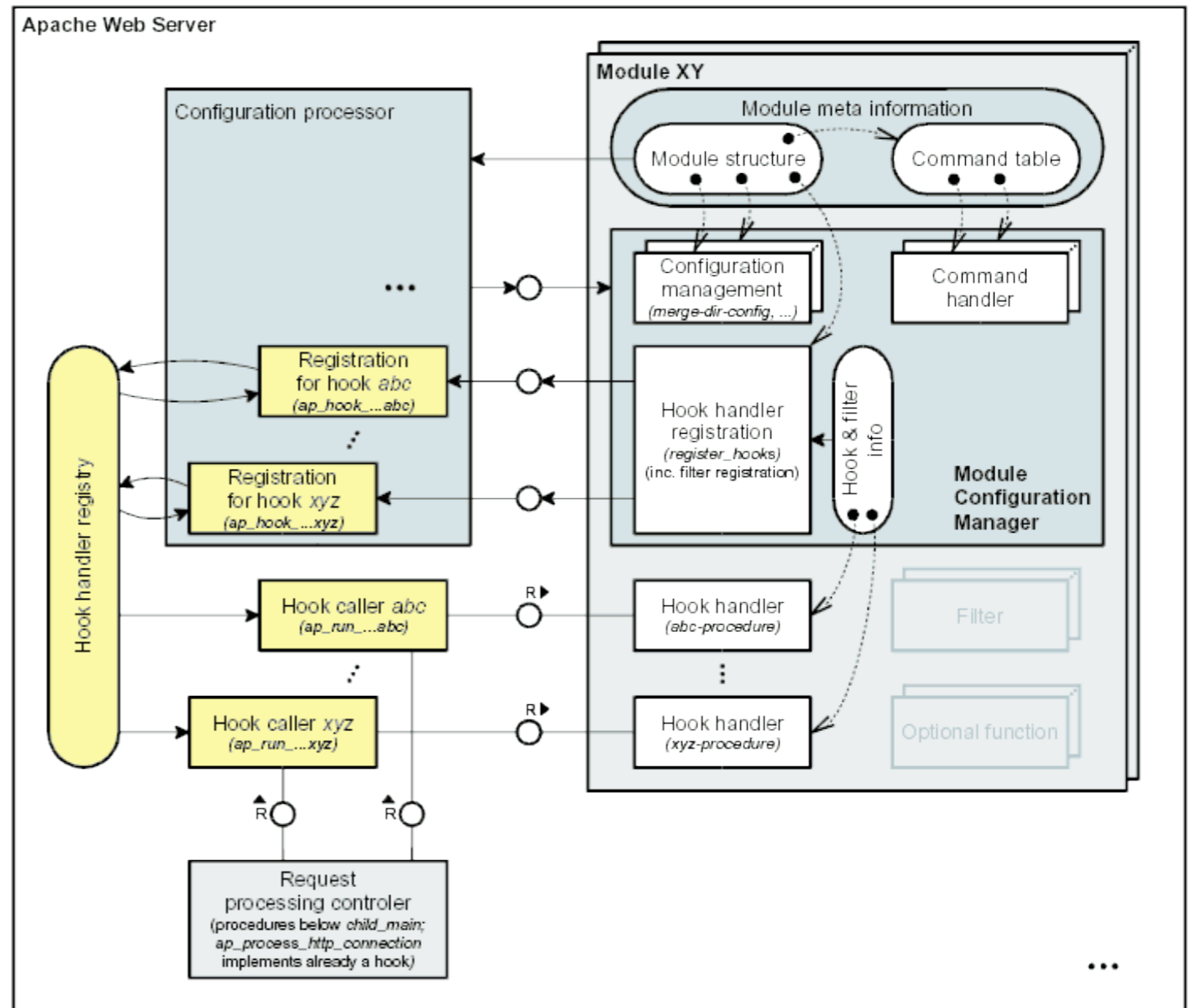
Apache httpd: modules

Modules

- simplify core
- enable independent development
- promote experiments

Project improves

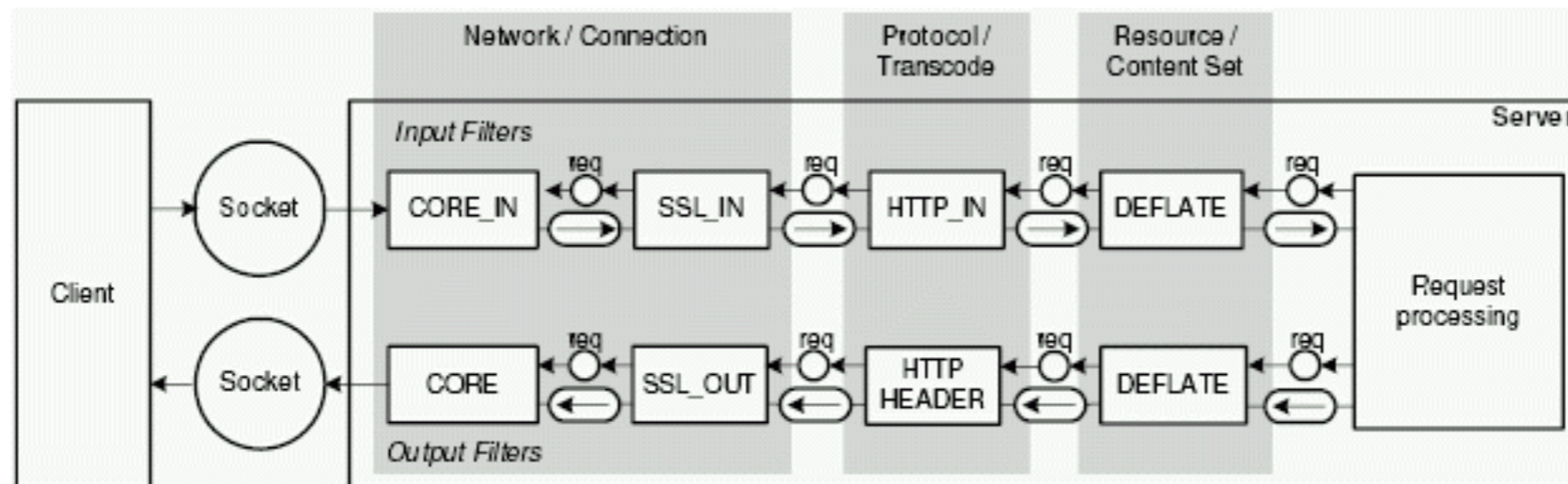
- reduced friction
- anarchic growth
- more features
- less communication



Agent/Storage definition is generated by processing the C-MACROS AP_DECLARE_HOOK, APR_IMPLEMENT_HOOK_(VOID | RUN_FIRST | RUN_ALL), APR_HOOK_STRUCT & APR_HOOK_LINK

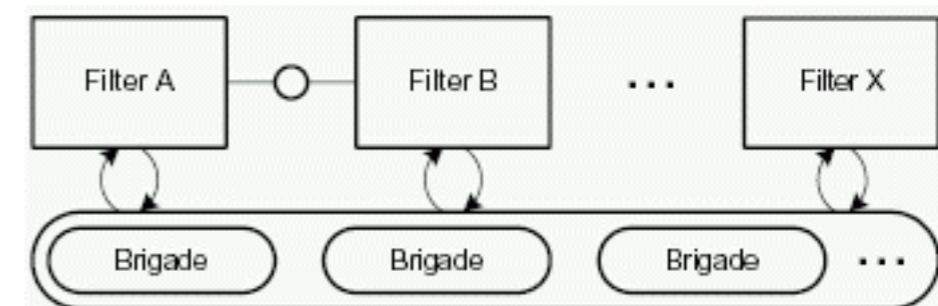
[Apache Modeling Project, f-m-c.org]

Apache httpd: I/O filters



Filters provide more extensibility

- **protocol replacement**
 - **httpd, ftpd, nntpd, ...**
- **stackable content manipulation**
 - **extensions that can extend other extensions**



[Apache Modeling Project, f-m-c.org]

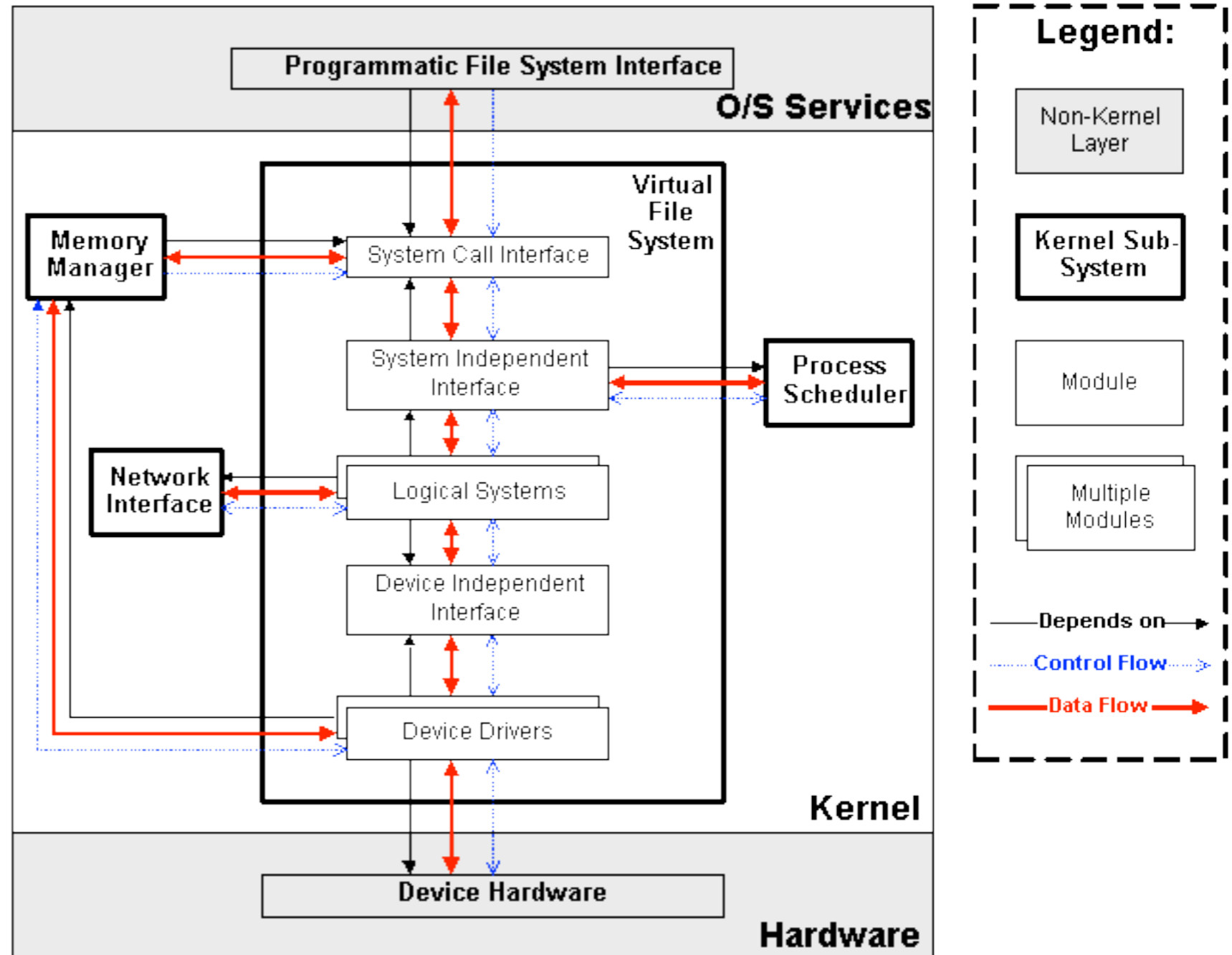
Linux Kernel Modules

Modules

- simplify core
- enable independent development
- promote experiments

Project improves

- reduced friction
- anarchic growth
- more features
- less communication



[diagram from Ivan T. Bowman, 1998]

Mozilla Firefox

Open Source

Extensible

Architecture

Plug-in Tools

Layered CSS

Editor Platform

The screenshot shows the Mozilla Firefox website in a browser window. The browser title is "Firefox - Rediscover the web" and the address bar shows "http://www.mozilla.org/products/firefox/". The browser's toolbar includes various icons for navigation and development. A "Web Developer" panel is open on the left, displaying CSS code for the "Cavendish Template Styles". The code includes comments and styles for the body and header elements. The main content area of the website features the Mozilla logo, a search bar, and navigation links for Products, Support, Store, Developers, and About. A prominent "Free Download" button is visible, along with a "Why Use Firefox?" section containing quotes from USA Today and The New York Times. A "Support Our Work" section is also present at the bottom right.

Firefox - Rediscover the web

http://www.mozilla.org/products/firefox/

Disable CSS Forms Images Information Miscellaneous Outline Resize Validation View Source Options

Web Developer

Load Save Clear Reset All

content.css content.css

template.css template.css

```

/* mozilla.org Cavendish Template
Styles
 * Initial Design by Daniel Burka
 and Steven Garrity
 */

/* Basic Structure */
body {
    background: #fff
url("../images/body_back.gif")
repeat-x;
}

/* Header */

#header {
    background:
#455372
url("../images/header_b1.png")
bottom left repeat-x;
    position:
relative;
    min-height: 39px;
    height: 5em;
    padding: 0;
    voice-family:
"\}\}";
    voice-family:
inherit;
    height: 3em;
    padding: 15px 0;
} #ignored {}

#header_b1 /

```

mozilla search mozilla: Go

Products Support Store Developers About

Firefox rediscover the we

The Firefox Preview Release empowers you to browse faster, more safely, and more efficiently than with any other browser. Join more than **6 million** others and make the switch today—Firefox imports your Favorites, settings and other information, so you have nothing to lose.

Free Download for MacOS X, English (8.4MB)

Or, get the Firefox CD & Guidebook from the Mozilla Store.

- Other Systems and Language
- System Requirements
- Release Notes
- Spread the Word

Why Use Firefox?

"Beware of spyware. If you can, use the Firefox browser." - USA Today

"Better than Internet Explorer by leaps and bounds."

Support Our Work

You can support our work on Firefox and

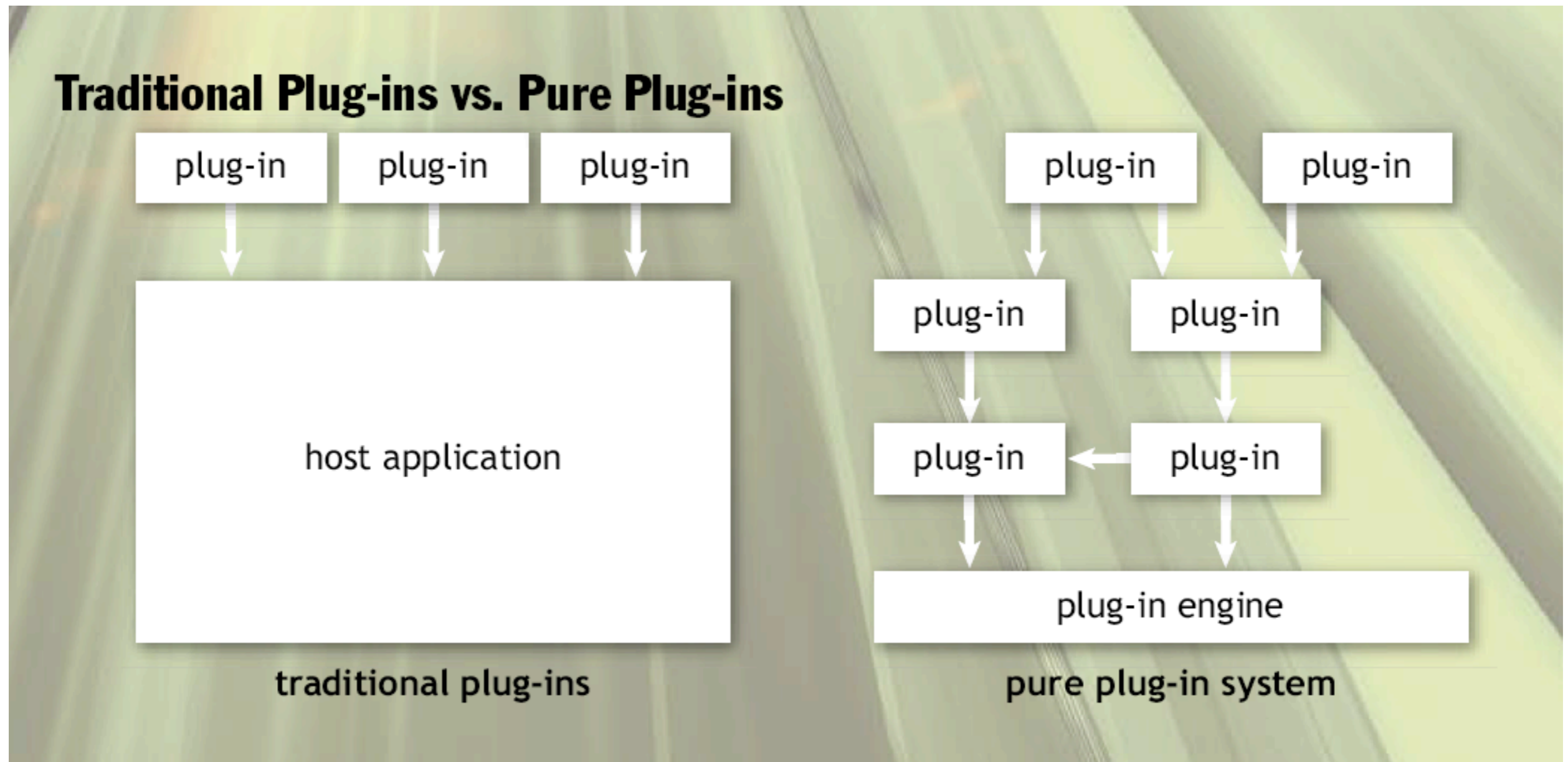
The New York Times

Firefox Released

Done

Eclipse Platform

Taking modular extensibility to the next level



[Birsan, *ACM Queue*, Mar 2005]

Eclipse Platform

The screenshot displays the Eclipse IDE interface for developing a plugin. The main editor shows the 'plugin.xml' file with the following XML content:

```
<?xml version="1.0" encoding="UTF-8"?>
<?eclipse version="3.0"?>
<plugin
  id="testpluginabc"
  name="Testpluginabc Plug-in"
  version="1.0.0"
  provider-name="example"
  class="test_plugin_abc.Test_plugin_abcPlugin">

  <runtime>
    <library name="test_plugin_abc.jar">
      <export name="*" />
      <packages prefixes="test_plugin_abc" />
    </library>
  </runtime>
  <requires>
    <import plugin="org.eclipse.ui" />
    <import plugin="org.eclipse.core.runtime.compatibility" />
  </requires>

</plugin>
```

The Package Explorer on the left shows the project structure:

- Package_1
 - HelloWorld.java
 - JRE System Library [J]
 - test_plugin_abc
 - src
 - test_plugin_abc
 - Test_plugin_abc
 - Test_plugin_abcPlugin
- Plug-in Dependencies
- JRE System Library [J]
- build.properties
- plugin.xml

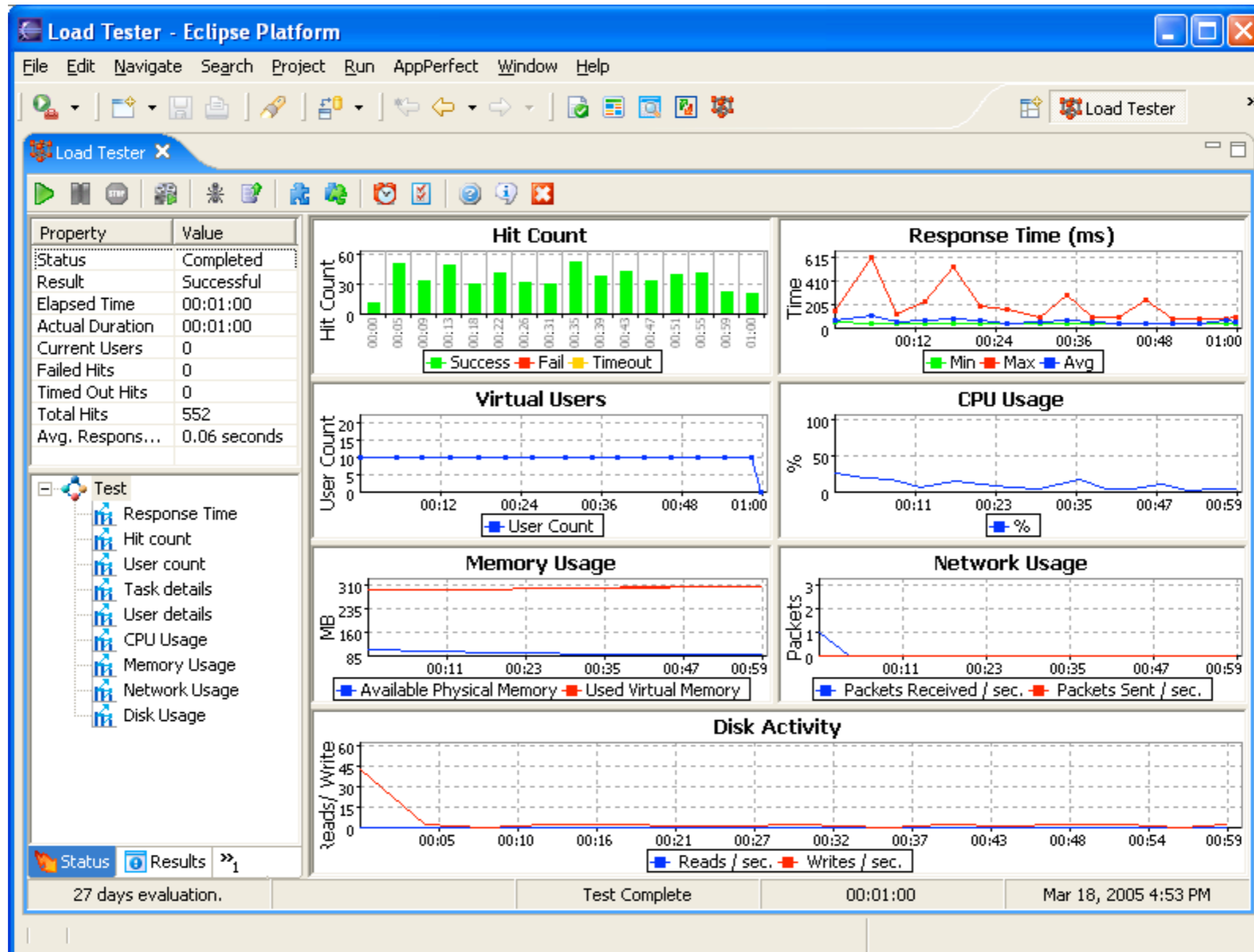
The Outline view on the right shows the plugin's structure:

- testpluginabc (I)
 - runtime
 - test_pl
 - requires
 - org.ecli
 - org.ecli

The Error Log at the bottom shows two error messages:

| ! | Message | Plug-in | Date |
|---|--------------------------------|----------------|-------------------------|
| ✖ | java.lang.NullPointerException | org.eclipse.ui | May 12, 2004 17:31:12.6 |
| ✖ | Unhandled event loop exc | org.eclipse.ui | May 12, 2004 17:31:12.6 |

Eclipse Platform



Apache Sling

Drop-in
Extensibility
using
OSGi Bundles

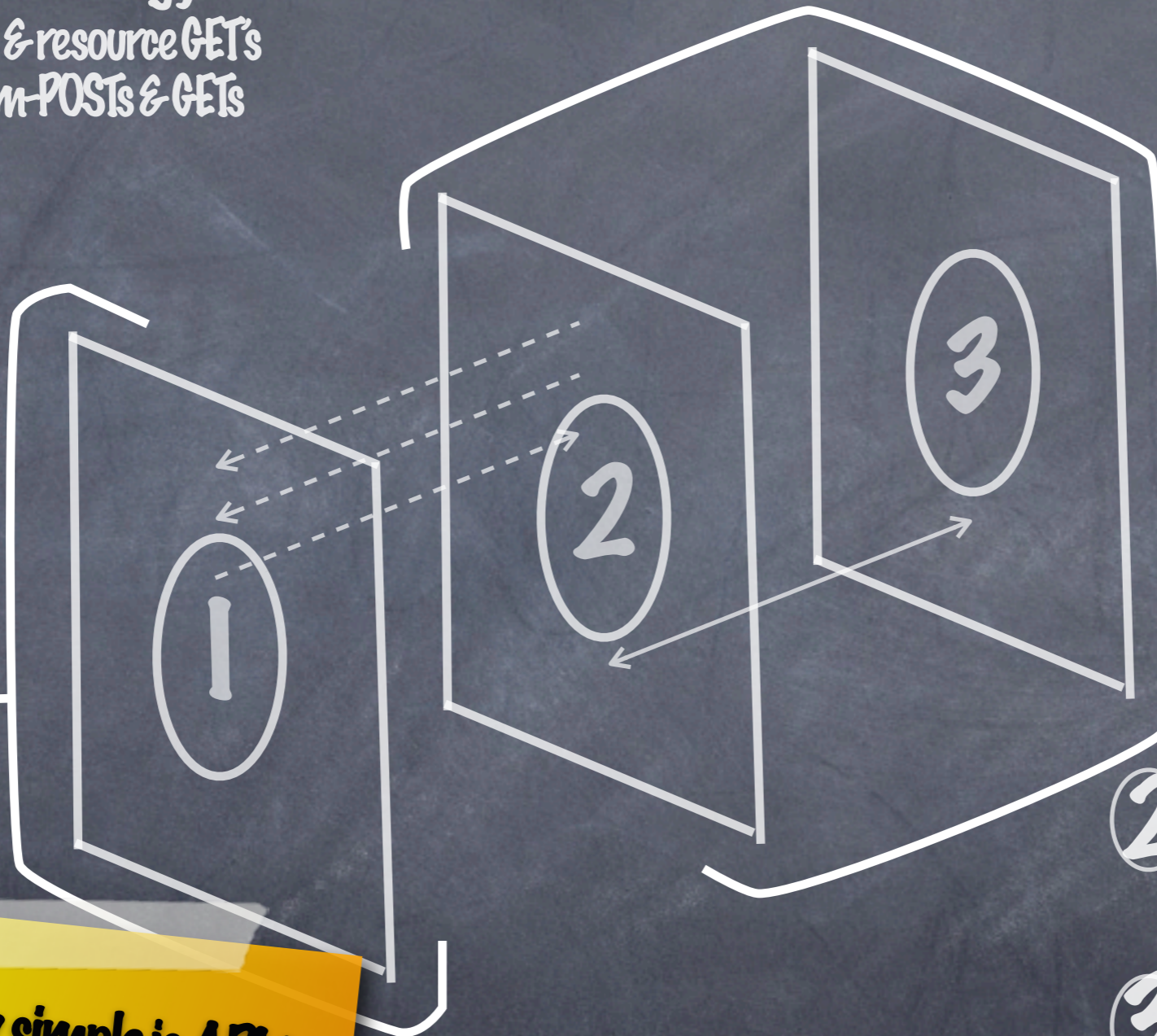
jsp
groovy
...
esp
ruby
scala

+

JCR backed
Content-oriented
WebDAV-able
REST-based

1 browser & sling.js
reading: json & resource GET's
writing: form-POSTs & GETs

Browser



J2EE Web Server

handles all the heavy lifting, particularly security

16 tons

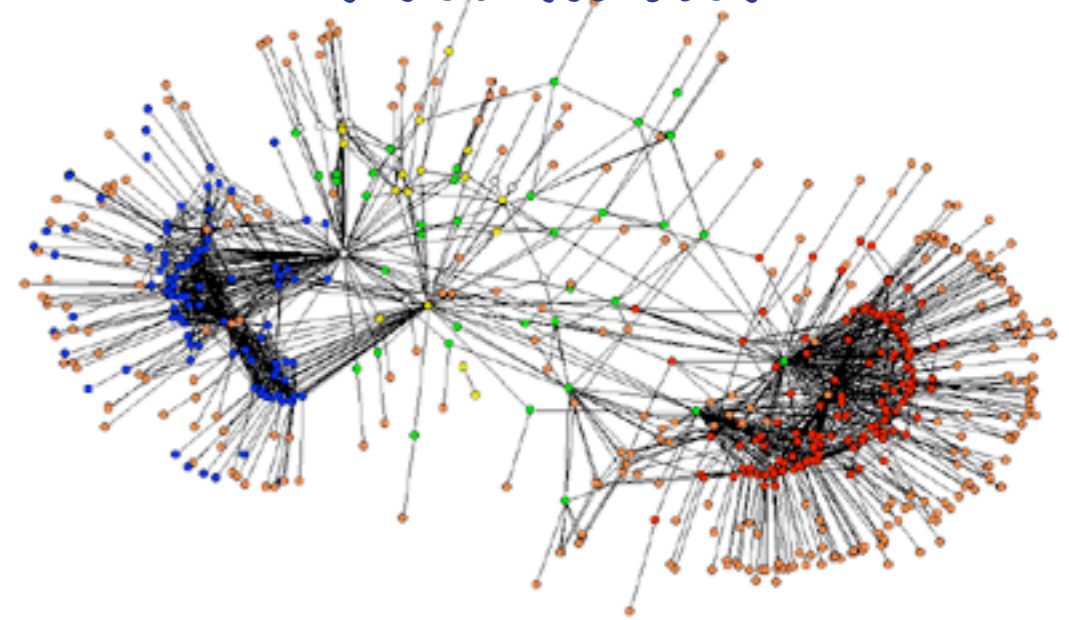
very simple js API to read content, Forms to write content

2 Sling Servlets translating requests to JCR calls

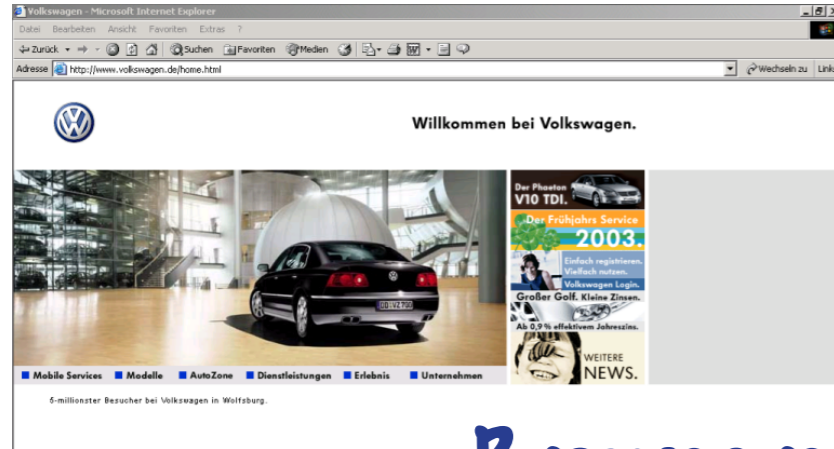
3 JCR Compliant Content Repository

The World Wide Web Project

Information



Browsers



W3C

HTML 4.01 Specification
W3C Recommendation 24 December 1999

This version:
<http://www.w3.org/TR/1999/REC-html401-19991224>
(plain text [794Kb], gzip'd tar archive of HTML files [371Kb], a zip archive of HTML files [425Kb], gzip'd Postscript file [745Kb, 389 pages], gzip'd PDF file [963Kb])

Latest version of HTML 4.01:
<http://www.w3.org/TR/html401>

Latest version of HTML 4:
<http://www.w3.org/TR/html4>

Latest version of HTML:
<http://www.w3.org/TR/html>

Previous version of HTML 4.01:
<http://www.w3.org/TR/1999/PR-html40-19990824>

Previous HTML 4 Recommendation:
<http://www.w3.org/TR/1998/REC-html40-19980424>

Editors:
Dave Raggett <dsr@w3.org>
Arnaud Le Hors, W3C
Ian Jacobs, W3C

Copyright © 1997-1999 W3C® (MIT, INRIA, Keio), All Rights Reserved. W3C and software licensing rules apply.

Abstract
This specification defines the HyperText Markup Language (HTML) for the World Wide Web. This specification defines HTML 4.01, which is a minor revision to the text, multimedia, and hyperlink features of the previous version and HTML 2.0 [RFC1865]. HTML 4 supports more multimedia content, better printing facilities, and documents that are more accessible. HTML 4 also takes great strides towards the internationalization of the Web truly World Wide.

HTML 4 is an SGML application conforming to the International Standard Generalized Markup Language [ISO8879].

Status of this document

**Uniform Resource Identifier (URI):
Generic Syntax**

Status of this Memo
This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Copyright Notice
Copyright © The Internet Society (2005). All Rights Reserved.

Abstract
A Uniform Resource Identifier (URI) is a compact sequence of characters that identifies an abstract or physical resource. This specification defines the generic URI syntax and a process for identifying and resolving URIs. It also defines a set of guidelines and security considerations for the use of URIs. The specification defines a grammar for a subset of valid URIs, all implementations must use the common components of a URI reference without regard to the specific requirements of every possible identifier. This specification does not define a generative grammar for URIs; that task is performed by the individual specifications of each URI scheme.

Network Working Group
Request for Comments: 2068
Category: Standards Track

R. Fielding
UC Irvine
J. Gettys
J. C. Mogul
DEC
H. Frystyk
T. Berners-Lee
MIT/LCS
January 1997

Hypertext Transfer Protocol -- HTTP/1.1

Status of this Memo
This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

T. Berners-Lee
W3C/MIT
R. Fielding
Day Software
L. Masinter
Adobe Systems
January 2005

HTTP is an application-level protocol for distributed, collaborative, hypertext systems. It is a generic, stateless, object-oriented protocol which can be used for distributed object management systems, through extension of its syntax and negotiation of data representation, allowing systems to be used for data transfer.

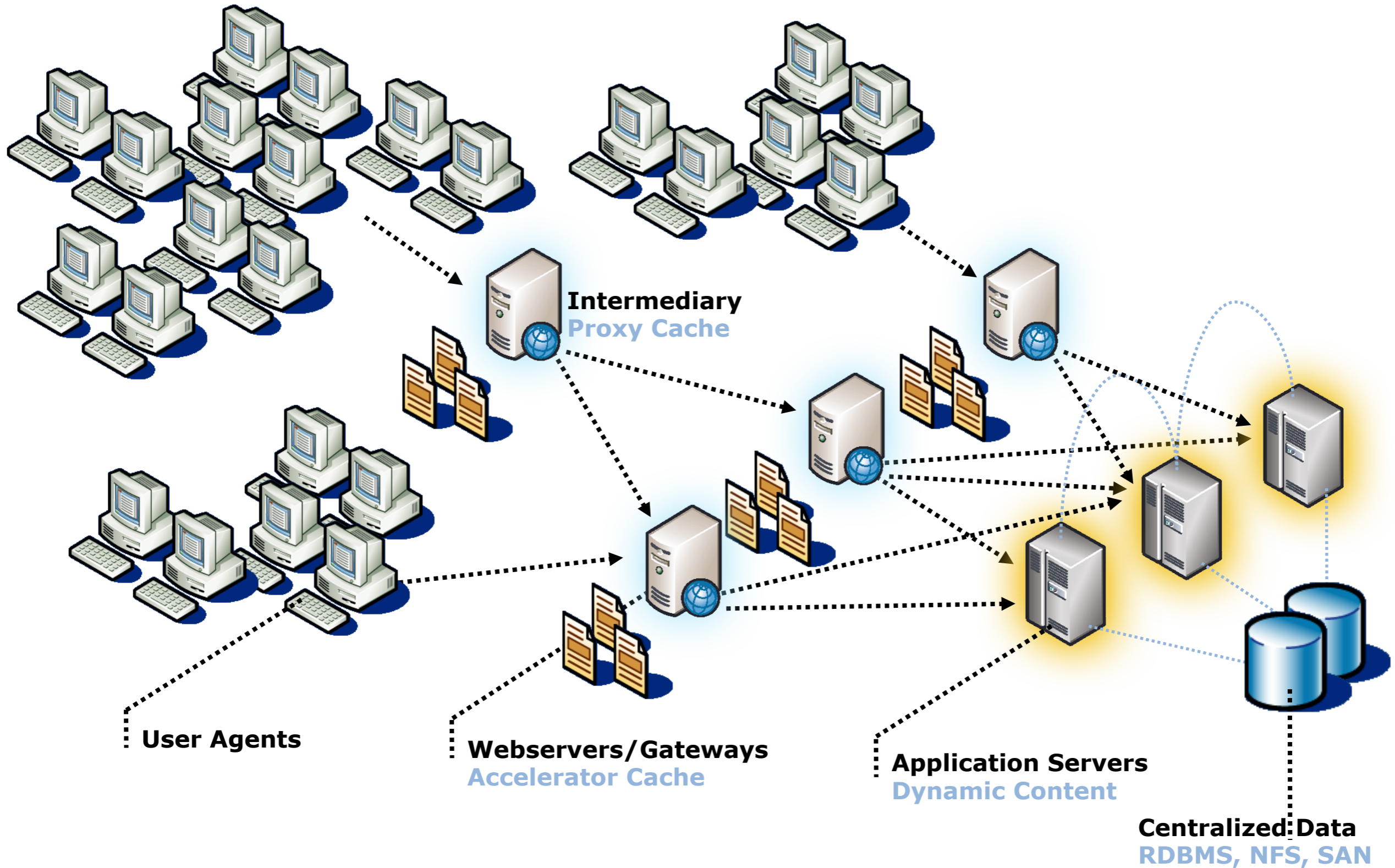
World Wide Web global information initiative since 1990. This specification defines the Hypertext Transfer Protocol (HTTP/1.1).

Web Implementation (user view)

The image illustrates the user view of web implementation through various early web browsers and a network diagram. The components shown are:

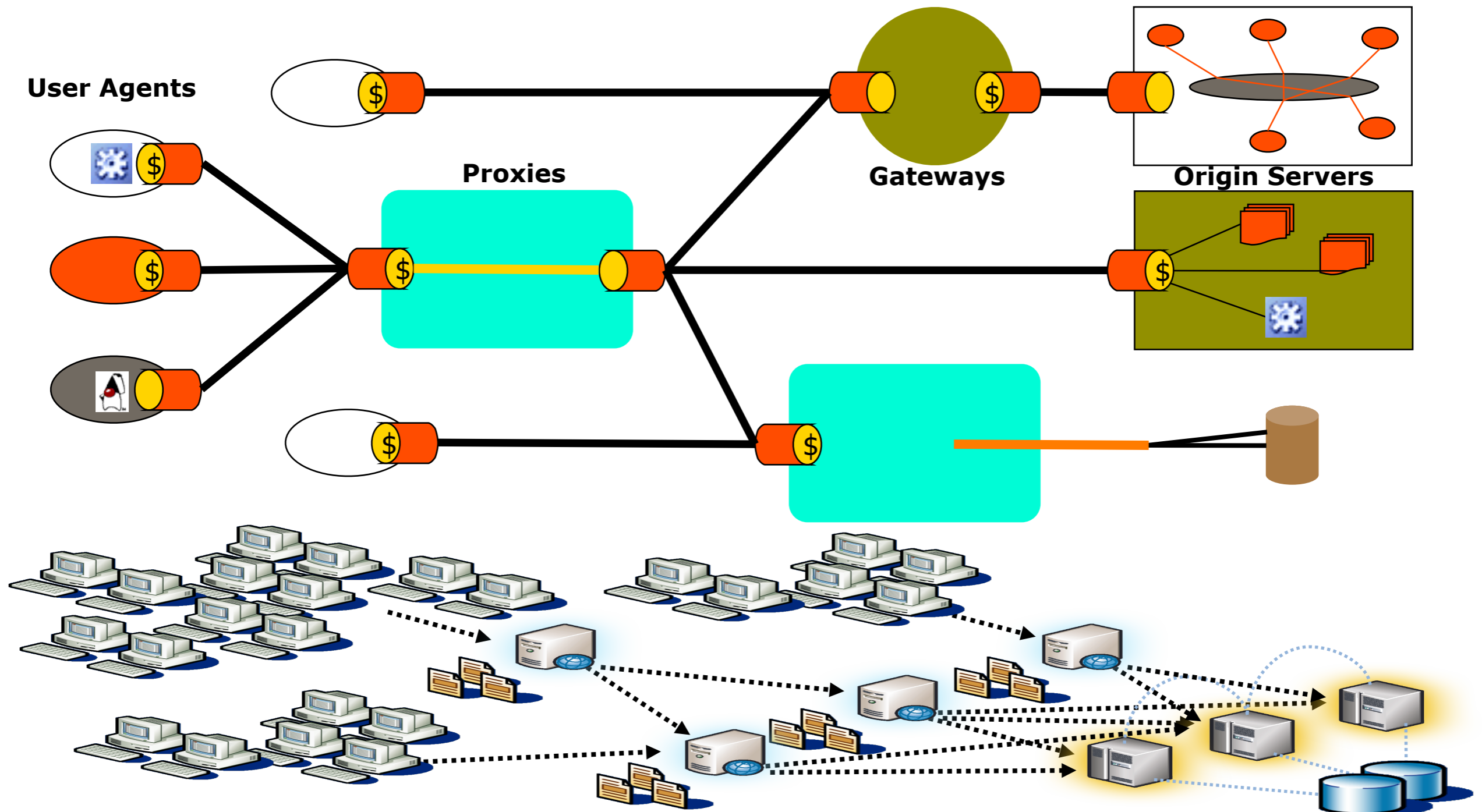
- NCSA Mosaic Document View:** Displays a document titled "SunSITE Northern Europe at the Department of Computing, Imperial" with a URL of `http://src.doc.ic.ac.uk/`. It features a "Special Note" dated 2/Nov/94 and navigation buttons like Back, Forward, Home, Reload, Open..., Save As..., Clone, New Window, and Close Window.
- MS-DOS Prompt:** Shows a terminal window for "THE UNIVERSITY OF LEEDS" with text about "The World Wide Web" and a welcome message.
- ViolaWWW:** Displays a "Home page" for "Leeds WWW Demonstration" with links for News, Chemistry, CBL, and Help. It also shows "CERN Information" with links for Phone book, Computer center, H.E.P., CERN News, and CERN RPC.
- Cello WWW Browser:** Shows a "Welcome to the Cello Internet Brows" message, version 1.01a from March 16 1994, and a description of Cello as a multipurpose Internet browser.
- Network Diagram (Plexus):** A central diagram of interconnected nodes and lines, representing a network structure, with colored arrows pointing to the browser windows.
- Logos:** Includes "Spinner" in a stylized font, "NCSA HTTPD" with a globe icon, and "APACHE HTTP SERVER PROJECT" with a feather logo.

Web Implementation (origin view)



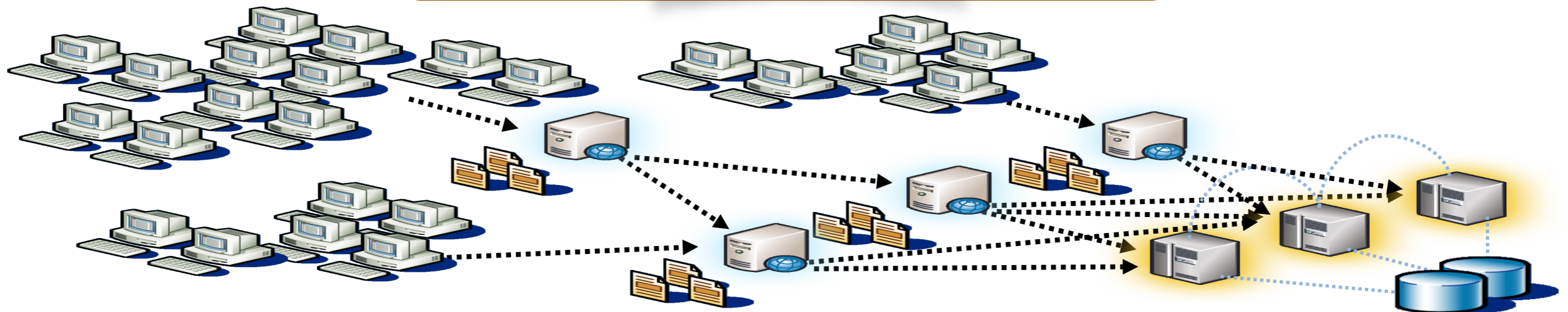
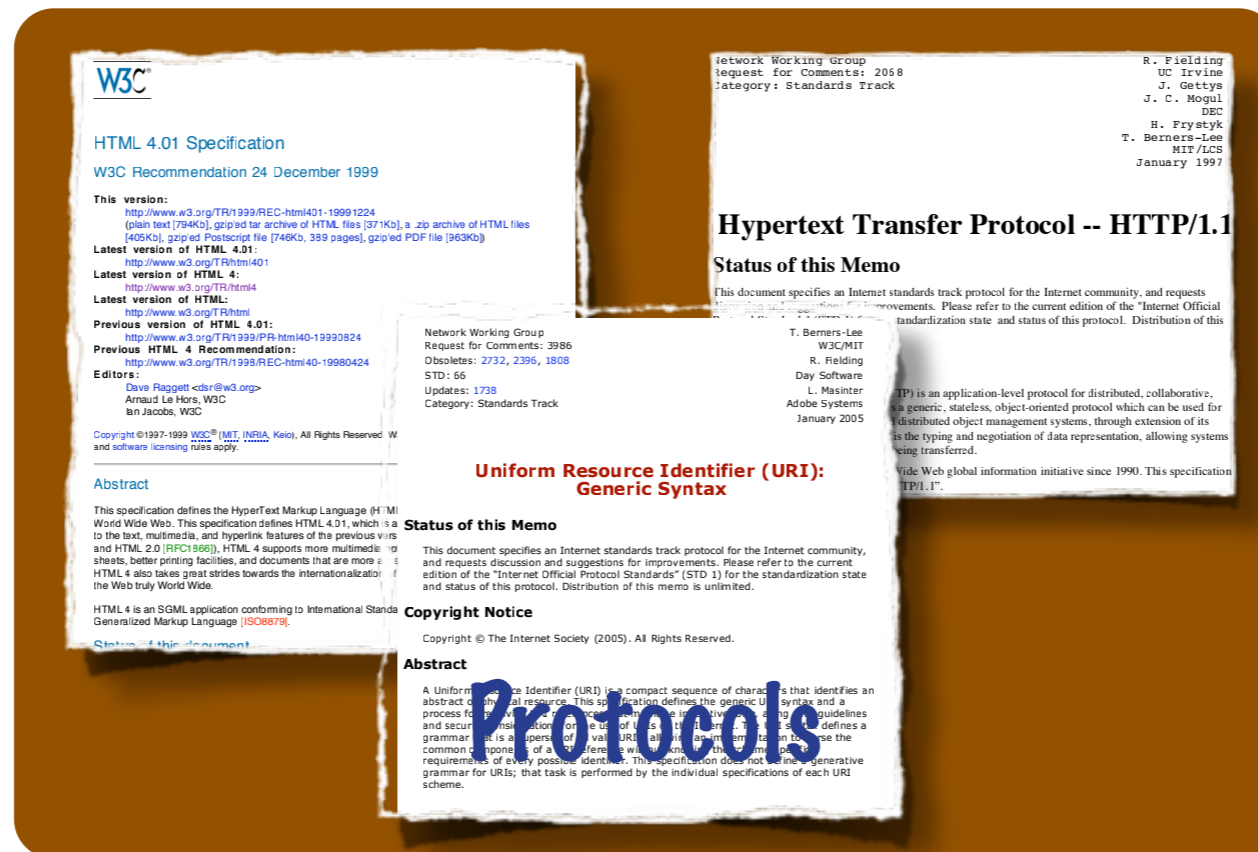
Web Architecture

A vertical abstraction on implementation



Web Architecture

A vertical abstraction on implementation



It's all about

Architecting

for

Open

Development