

Analyzing Software Licenses in Open Architecture Software Systems



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More and more systems...



- ... are composed of components from many sources
- ... under a variety of licenses (some of which may conflict)
- ... and evolving by component replacement not development

Unity Software

- Integrates multiple third party libraries
 - The Mono Class Library, Copyright © 2005 - 2008 Novell, Inc.
 - The Mono Runtime Libraries, Copyright © 2005 - 2008 Novell, Inc.
 - Boo, Copyright © 2003 - 2008 Rodrigo B. Oliveira
 - UnityScript, Copyright © 2005 - 2008 Rodrigo B. Oliveira
 - OpenAL cross platform audio library, Copyright © 1999 - 2006 by authors.
 - PhysX physics library. Copyright © 2003-2008 by Ageia Technologies, Inc.
 - libvorbis. Copyright (c) 2002-2007 Xiph.org Foundation
 - libtheora. Copyright (c) 2002-2007 Xiph.org Foundation
 - zlib general purpose compression library. Copyright (c) 1995-2005 Jean-loup Gailly and Mark Adler
 - libpng PNG reference library
 - jpeglib JPEG library. Copyright (C) 1991-1998, Thomas G. Lane.
 - Twilight Prophecy SDK, a multi-platform development system for virtual reality and multimedia. Copyright © 1997 - 2003 Twilight 3D Finland Oy Ltd
 - dynamic_bitset, Copyright © Chuck Allison and Jeremy Siek 2001 - 2002.
 - The Mono C# Compiler and Tools, Copyright © 2005 - 2008 Novell, Inc.
 - libcurl. Copyright (c) 1996 - 2008, Daniel Stenberg <daniel@haxx.se>.
 - PostgreSQL Database Management System (formerly known as Postgres, then as Postgres95)
 - FreeType. Copyright (c) 2007 The FreeType Project (www.freetype.org).
 - NVIDIA Cg. Copyright (c) 2002-2008 NVIDIA Corp.

Challenges to license analysis



- Licenses
 - Numerous license types, variants, versions
 - Incomplete
 - Hard to understand
 - Legally binding
- License analysis
 - May be intractable for developers, lawyers, etc.
 - May be constrained by time and resources

Applications Places System

GCTL - Package - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://proxy.arts.uci.edu/gamelab/

Logged in as: waltscacchi - Slacker, 150 points

GAME CULTURE & TECHNOLOGY LAB

Mission Events Projects Tools Players Package Docs

English Language

Search Advanced Search

prev - next ...

Package

Coming Soon! An updated version of the GCTL portal software. This open source distribution package is our little gift to those of you who may want to set up a collaboration infrastructure of your own. That's right... believe it or not it's FREE!!!

Here's what the generic version will look like once installed.

Getting Face-Lifted: 09/15/2008 VCP 1.0

- MySQL/PHP-based Portal CMS (see the "Docs")
- Wiki (using MediaWiki)
- Weblog (using B2evolution)
- News Feeder (using Gregarius)
- Document Version Control System (using DCM v2.0)
- Teleconference Suite (using Red5 Flash Server and BlaB! Lite)
- Search Engine and Crawlbot (using Sphider)

Calendars - Evolution

File Edit View Actions Search Help

New Send / Receive Print Delete Previous Today Next Go To Day

Calendars Monday 12 Jan 2009 Show: Any Category Search: Summary Contains

Google

- Walt Scacchi

On This Computer

- Personal

Contacts

- Birthdays & Annivers...

January 2009

Mon	Tue	Wed	Thu	Fri	Sat	Sun
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

Mail

Contacts Calendars

Tasks Memos

Monday 12 January

9 am

10 am

11 am

12 pm

1 pm

2 pm

3 pm

4 pm

5 pm

6 pm

7 pm

8 pm

Tasks

Summary

Click to add a task

Memos

Summary

Click to add a memo

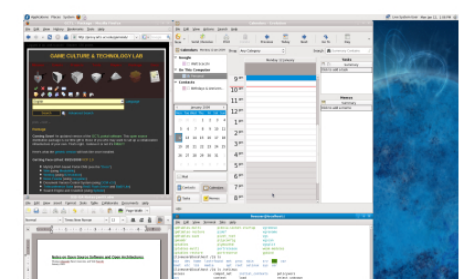
*OSS-OA-Notes-Jan09.abw

File Edit View Insert Format Tools Table Collaborate Documents Help

Normal Times New Roman 12

Notes on Open Source Software and Open Architectures

Thomas A. Spang, Hazel Asuncion, and Walt Scacchi
January 2009



liveuser@localhost:~

File Edit View Terminal Tabs Help

```

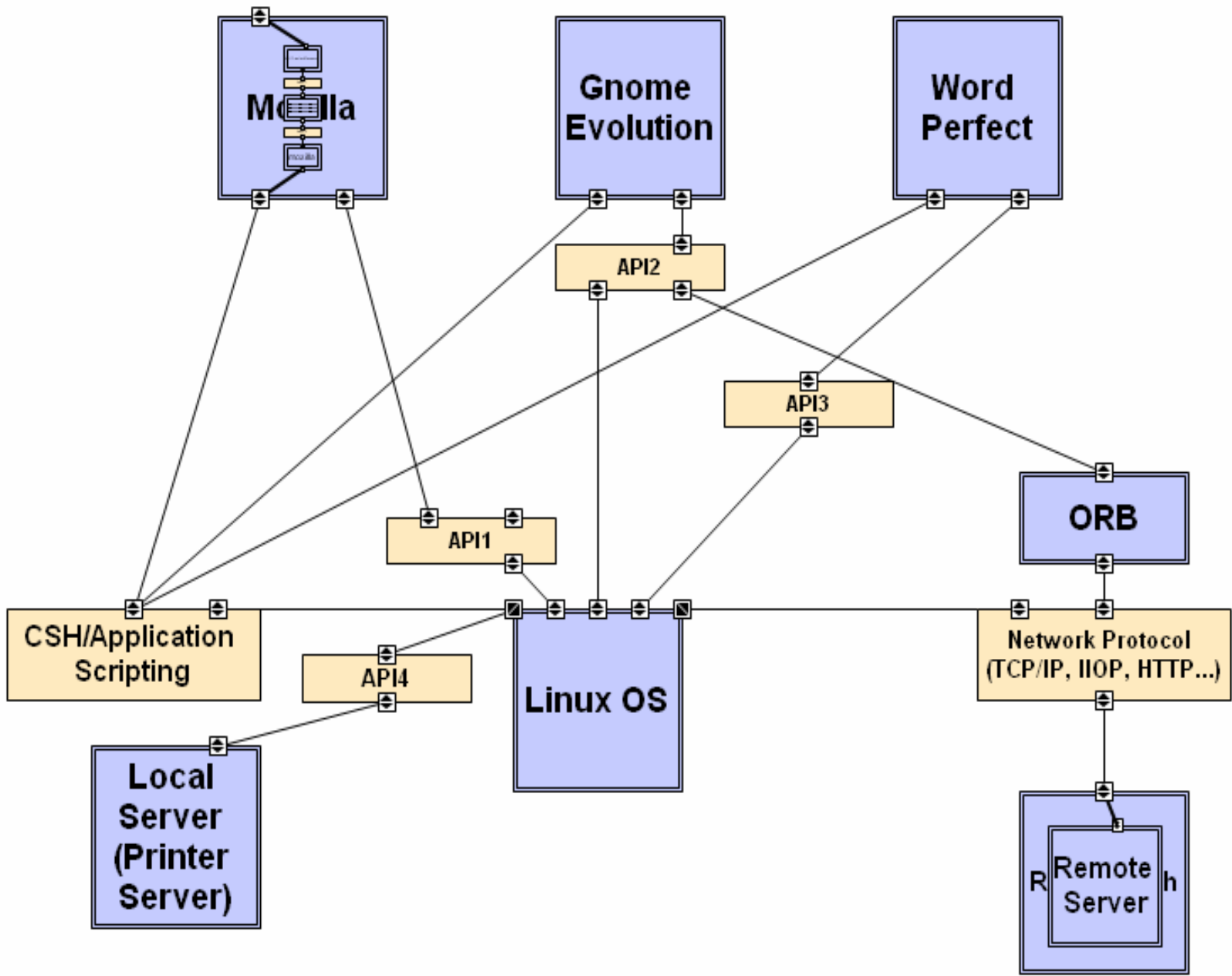
ip6tables-multi      pcmcia-socket-startup  vgrepmove
ip6tables-restore   pidof                  vgrepname
ip6tables-save       pivot_root             vgs
ipmaddr              plipconfig             vgsan
iptables             Plymouth               vgsplit
iptables-multi       portrelease            weak-modules
iptables-restore     portreserve            ypbind

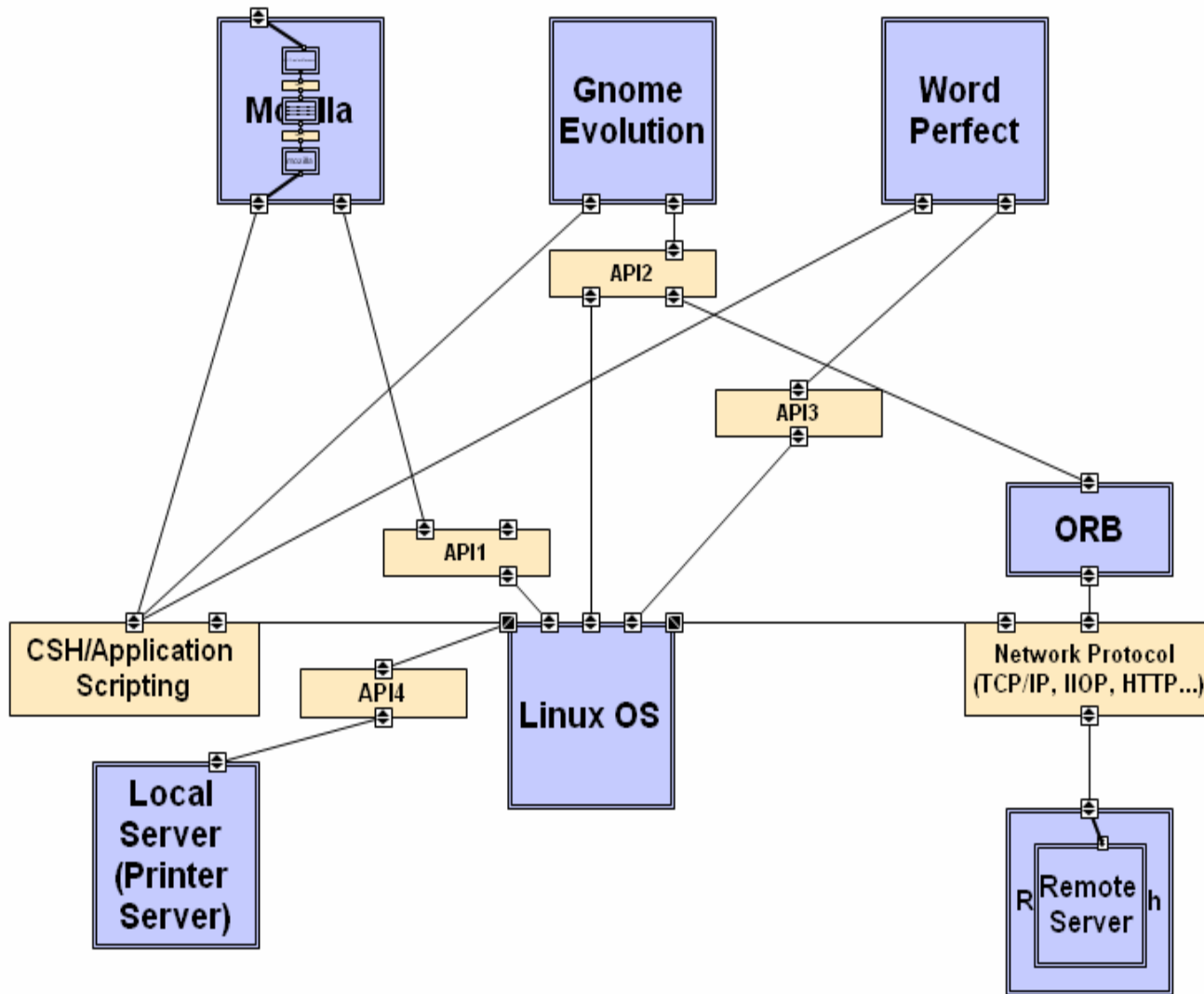
[liveuser@localhost /]$ ls
bin dev home lost+found mnt proc sbin  srv  var
boot etc lib media  opt root selinux sys  usr

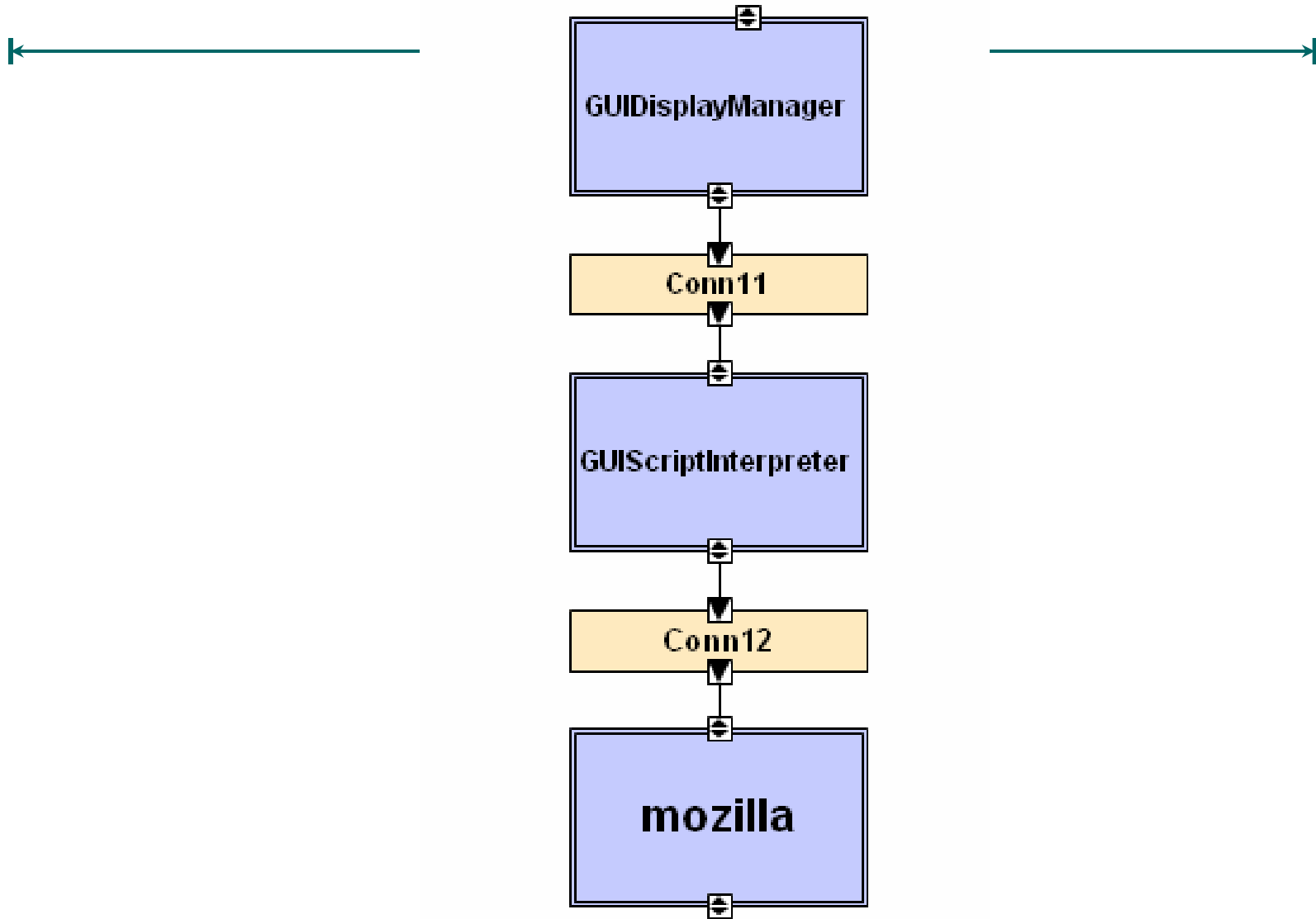
[liveuser@localhost /]$ ls /selinux
access          compat_net    initial_contexts  policyvers
avc              context      load               reject_unknown
booleans         create       member             relabel
checkreqprot    deny_unknown mls                user
class            disable      null
commit_pending_bools  enforce     policy_capabilities

[liveuser@localhost /]$

```







ArchStudio 4 - z_license/hci_2Level.xml - Eclipse SDK - C:\Documents and Settings\Hazel\ArchStudio4

File Edit Navigate Search Project Run Window Help

Outline

- /z_license/hci_2Level.xml
 - Activity Diagrams
 - Statecharts
 - Structures
 - main
 - MoZilla SubArch
 - RS_Subarch
 - Types
 - Component Type
 - MoZillaComp
 - RemoteServ
 - Connector Type
 - Interface Types

ArchStudio 4

Traceability Variability

New Tracelink

Start Recording Recover Manual

Tracelink Details

Import Links Export Links

Tracelink Options

Trace Analysis License Analysis

License Analysis

Necessary Rights but don't have:
 Licensee may sublicense GUIDisplayManager under [GPL 2]
 Licensee may sublicense GUIScriptInterpreter under [GPL 2]
 Licensee may sublicense Local Server (Printer Server) under [GPL 2]
 Licensee may sublicense Word Perfect under [GPL 2]
 Licensee may sublicense mozilla under [GPL 2]

OK


Diagram components: Mozilla, Gnome Evolution, Word Perfect, API2, API3, ORB, CSH/Application Scripting, Local Server (Printer Server), Remote Server, Work Protocol (IP, IIOP, HTTP...)


ArchStudio 4 Launcher File Tracker View Archlight Notices Tasks Archlight Issues SVN Repositories Console Debug

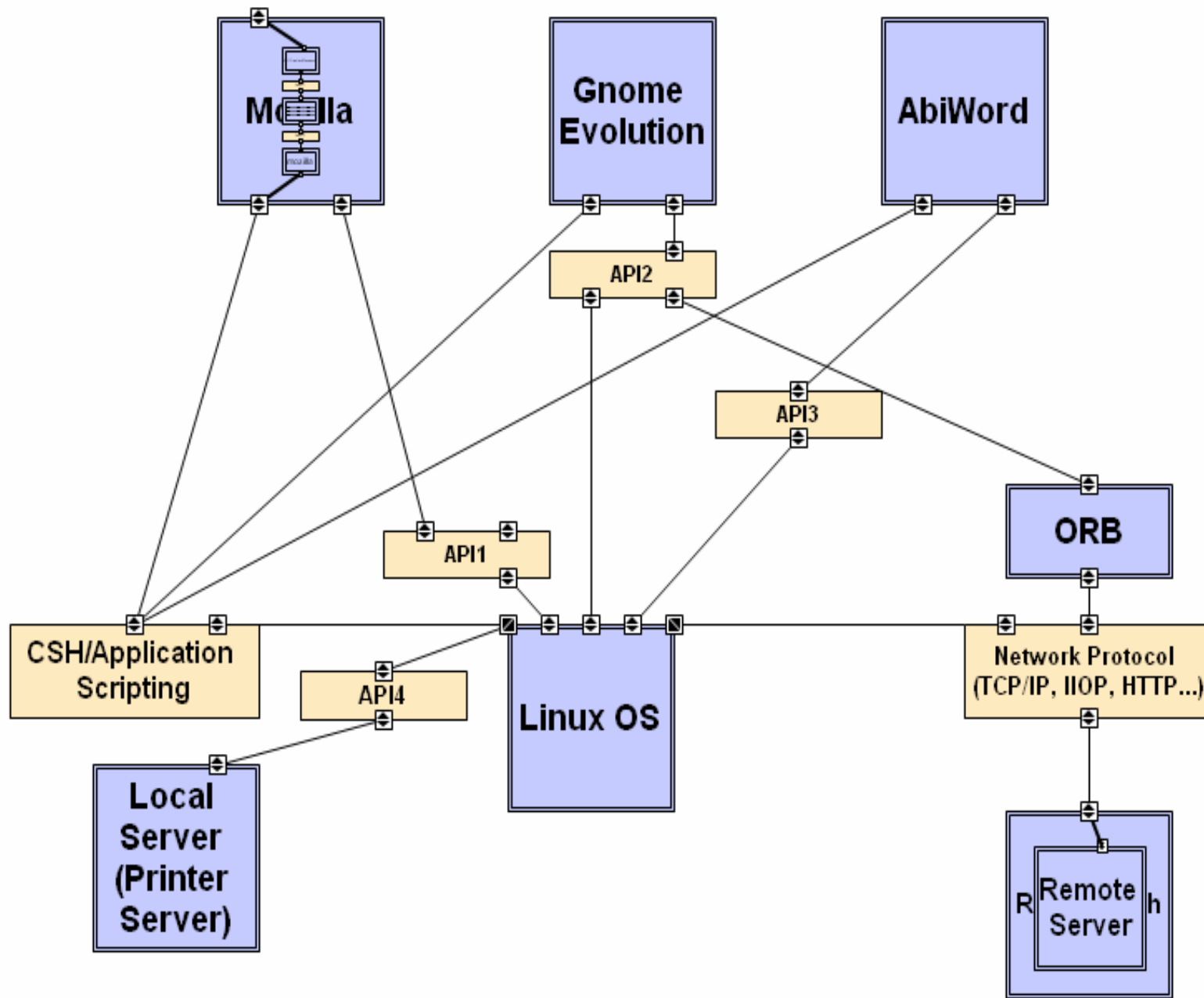
ArchStudio 4

Point mouse cursor at tool for more detail.



License Analysis 

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Licensee may sublicense mozilla under [GPL 2]



ArchStudio 4 - z_license/hci_2Level.xml - Eclipse SDK - C:\Documents and Settings\Hazel\archstudio4

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*hci_2Level.xml - Archipelago *hci_2Level.xml - ArchEdit

License Analysis

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Trace Analysis License Analysis

ArchStudio 4 Launcher File Tracker View Archlight Notices Tasks Archlight Issues SVN Repositories Console Debug

ArchStudio 4

Point mouse cursor at tool for more detail.

- AIM Launcher
- ArchEdit
- Archipelago
- Archlight
- Selector
- Type Wrangler

HelloWorld2a license .project hci_2Level.xml



License Analysis



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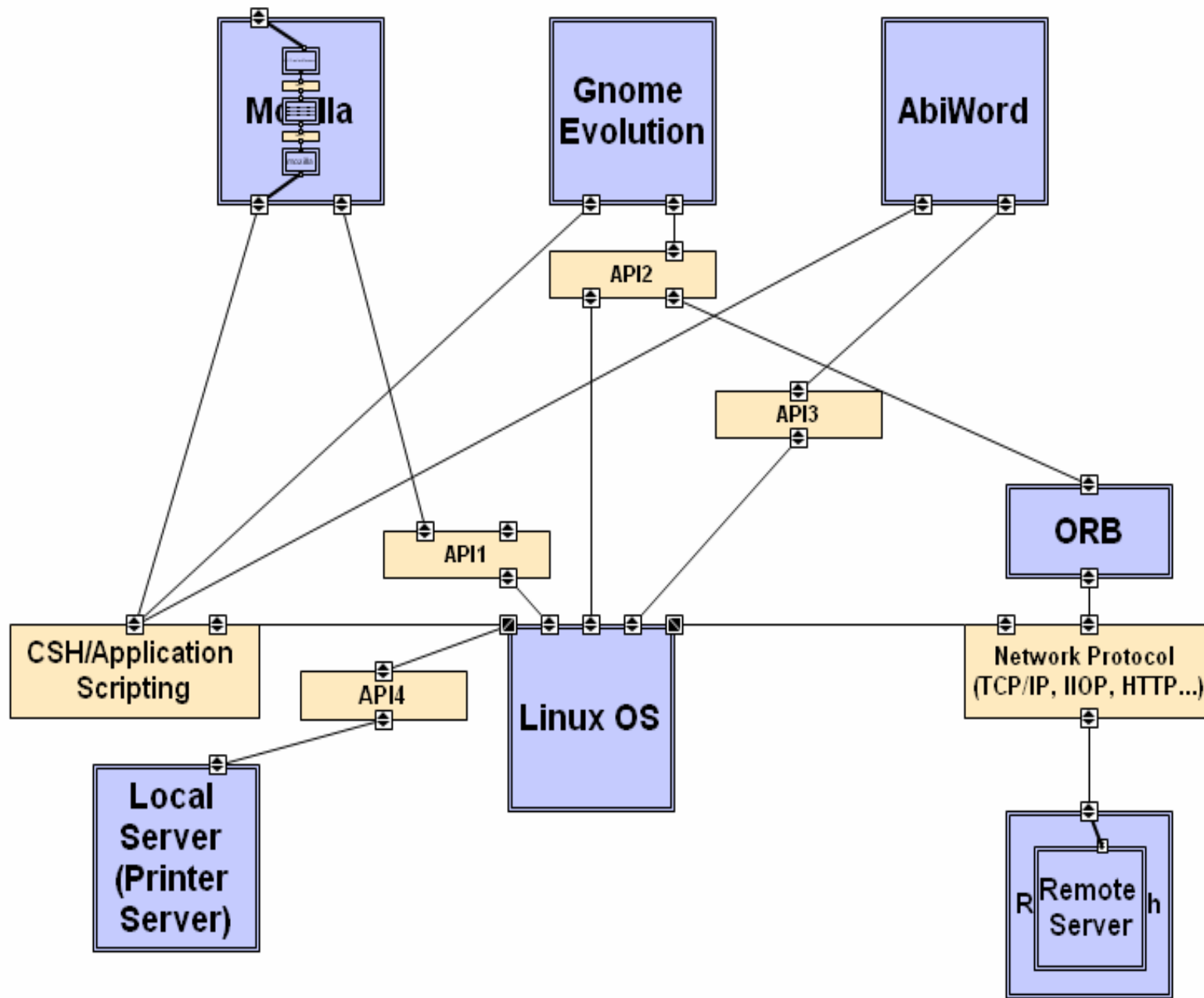
Licensee may sublicense mozilla under [GPL 2]

OK

License Firewall



- Blocks the propagation of reciprocal licenses
- Layer of connectors that surrounds a substructure
 - Dynamic links
 - Client server connections
 - License shims





License Analysis



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OK

Open Architecture (OA) System



- Open Architecture
 - OSS or proprietary with open API
 - Overall system rights minimally allows use and redistribution
- Topology of components and connectors
- Configured subsystem or system

Components



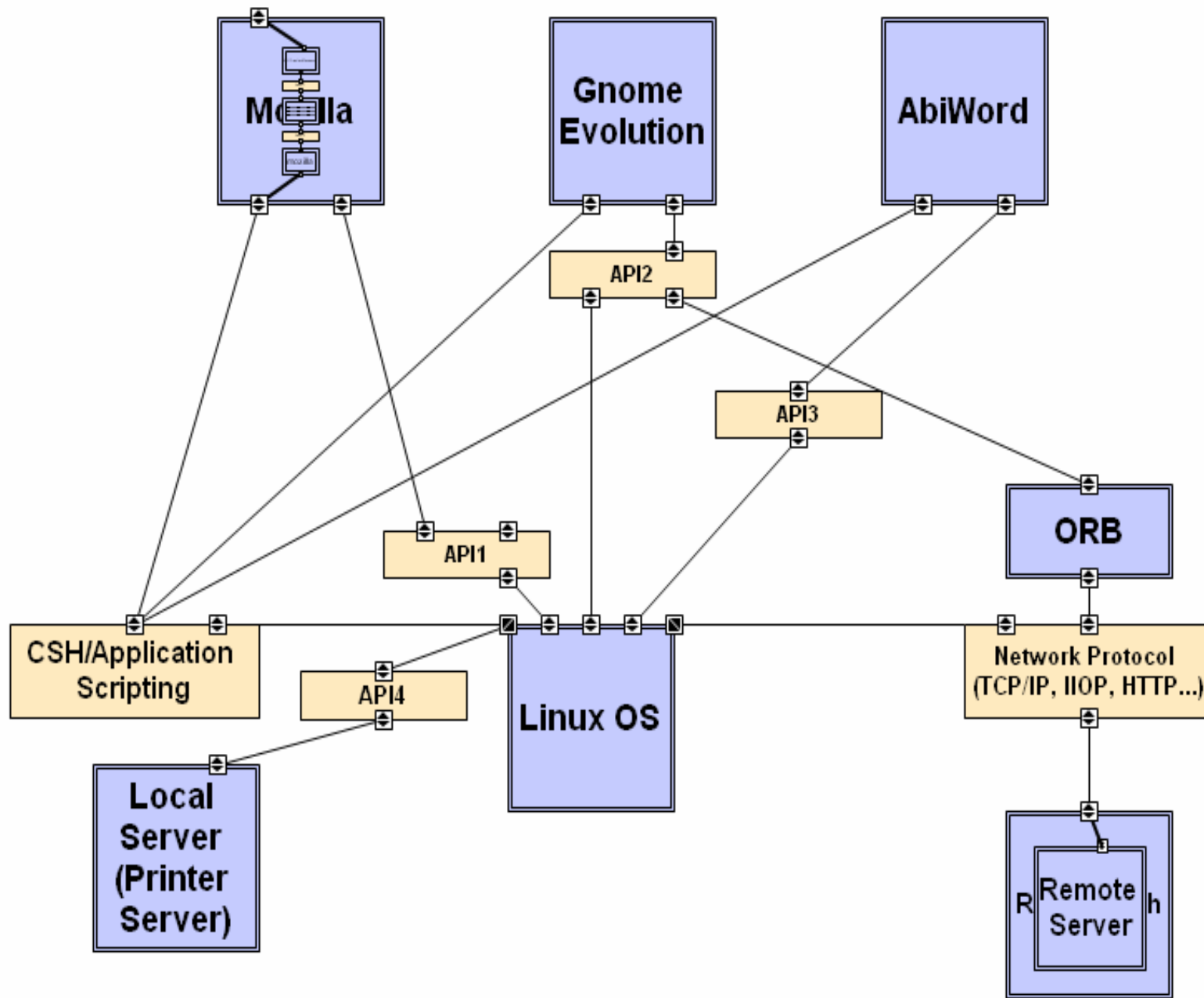
- Software source code components
 - Standalone programs
 - Libraries, frameworks, or middleware
 - Inter-application script code (e.g., for building subsystems)
 - Intra-application script code (e.g., for Rich Internet Apps.)
- Executable software components (binaries)
- Software services

Connectors



- Communication
 - Application program interfaces (APIs)
 - Network protocols
 - Etc.

- License
 - Propagate license
 - Act as a license firewall together with a substructure

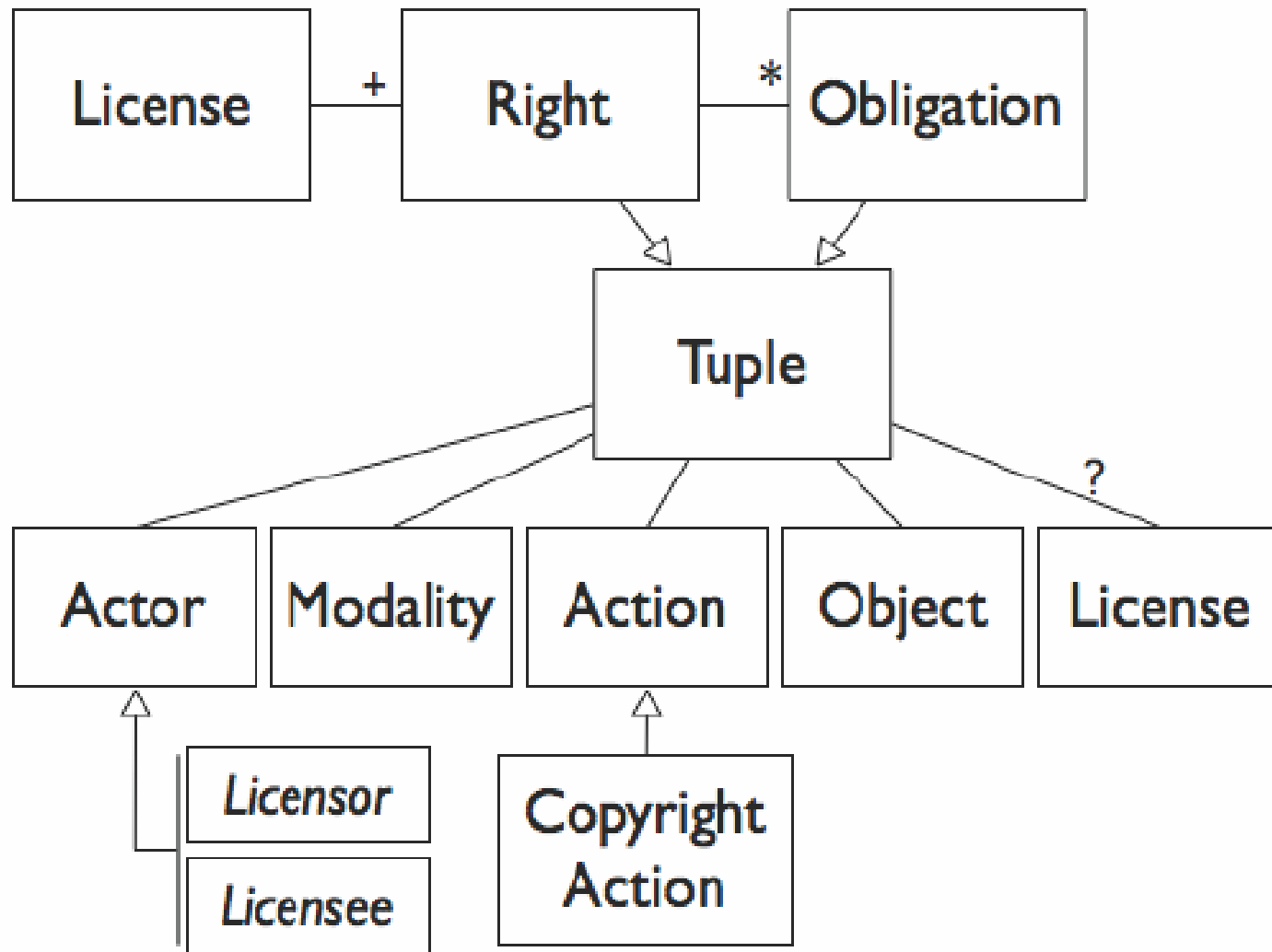


Different IP licenses



- Rights and obligations regarding usage
- GPL (Gnu Public License)
 - Right to access, study, modify, and *reciprocal* obligation to redistribute modified source code
- Mozilla
 - Tri-license for its software like Firefox Web Browser:
- Affero
 - Prevents the usage of a license firewall
- And many others!

License metamodel



Rights



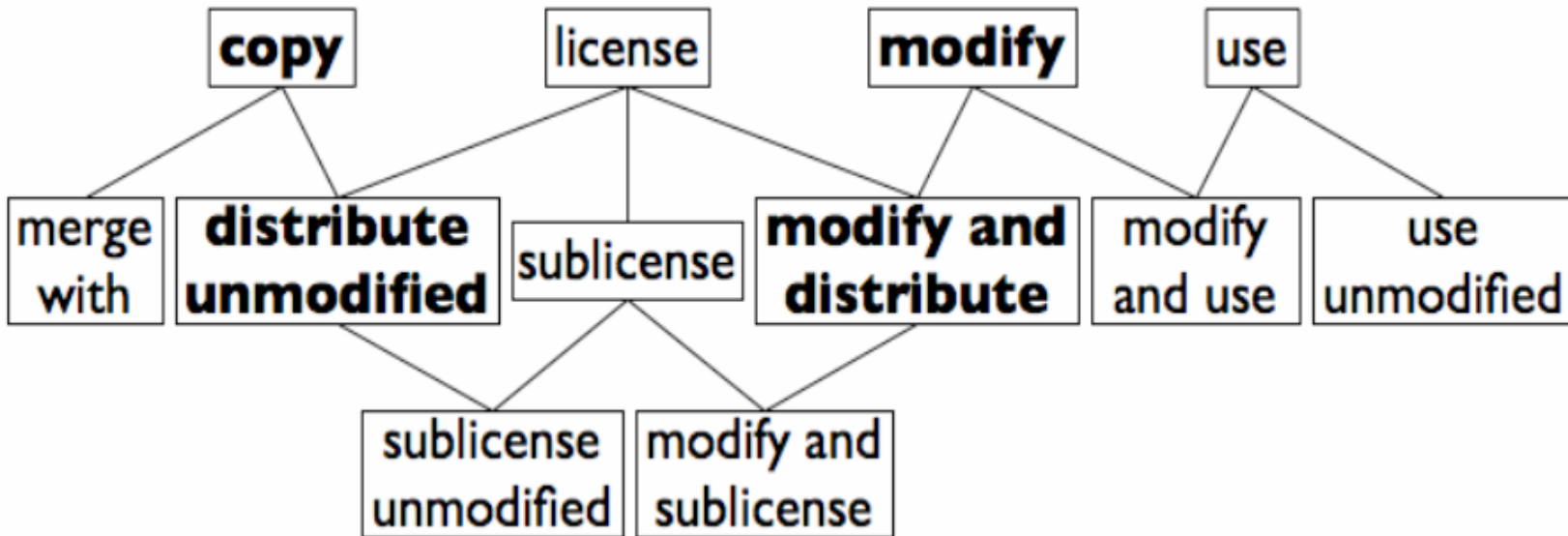
- Copyright
 - Author has certain rights: use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies
 - Rights may be licensed individually to others
 - Obligations

Obligations



- Pay a fee
- Preserve the copyright and license notices (academic licenses)
- Publish your modified source at no cost (MPL)
- Publish all source code linked with (reciprocal license – GPL)
- Derivative works sublicensed under the same license (GPL, MPL, ...)
- Collective works sublicensed under GPL regardless

Partial order of copyright actions



Modality and Object



- Modality
 - Right
 - May or Need Not
 - Obligation
 - Must or Must Not
- Object
 - May be source, component, or other items within scope

Example license (BSD)



- Right
 - Licensee * may * distribute <Any Source> under <This License>
- Obligation
 - Licensee * must * retain the [BSD] copyright notice in [file.c]

OA Design & License Analysis Environment

- Operational prototype OA design and license environment
- An extension to the *ArchStudio* Architecture Design Environment from UC Irvine
 - <http://www.isr.uci.edu/projects/archstudio/>

It is possible...



- To automate license analysis
 - Formal specification of licenses
 - Formal description of OA as xADL
- To analyze license interaction at different levels of granularity
 - Substructure level
 - System level
- To analyze license interaction across the different architecture levels
 - System to substructure levels

Acknowledgements



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- No endorsement implied.

Thank you!



Questions?