



Kuali OLE – A Next Generation Library Management System

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Technical Overview of OLE

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Modular Design



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Kuali

Rice

modules

Java

Malaysian for a kind of wok

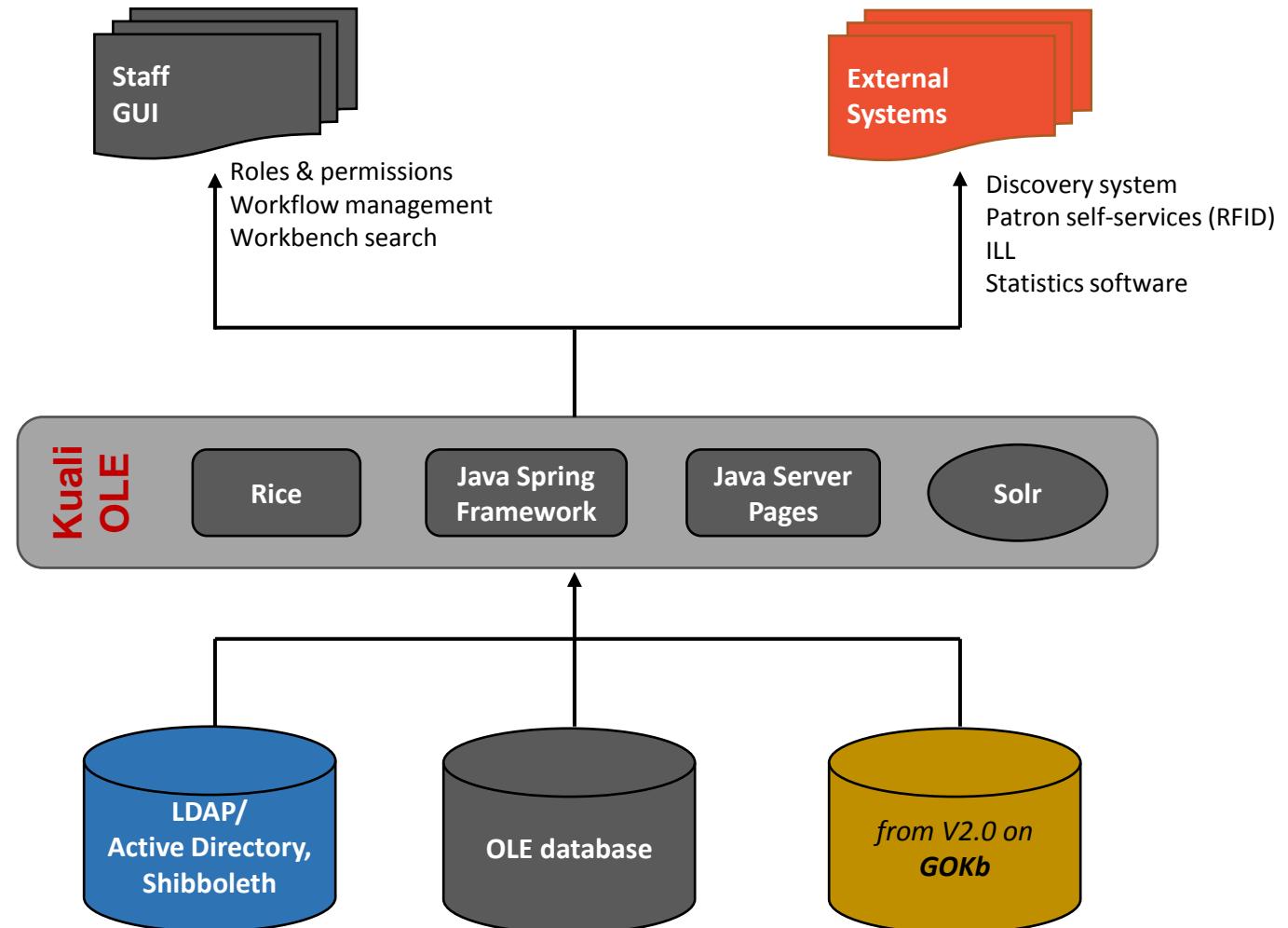
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open source system
for academic libraries

System Architecture

- Java: Rice (Middleware), Spring Framework, Java Server Pages
- Search server: Solr
- Data sources:
 - Identification: LDAP / Active Directory, Shibboleth
 - OLE database
 - GOKb
- GUI (roles & permissions, workflow, workbench search, ...)
- External systems:
 - External discovery system
 - Interfaces for RFID and ILL



System Architecture

- OLE is written in Java 7
 - About 5.350 Java files
 - Consisting of around 1 million lines (code, comments, blank lines)
 - Configuration and setup files
- Java Middleware
 - Kuali OLE (application) makes use of Kuali Rice (middleware), Java Server Faces and the Java Spring Framework.
 - In addition several hundreds freely available Java libraries.
 - Rice Middleware
 - In use in other Kuali software at about 20 universities for years
 - Open Source



System requirements – Hardware

- Server as a sandbox installation
 - Desktop PC, or virtual server
 - Memory: OLE recommends 8 GB RAM
 - 4 GB is possible (runs in two of three VZG installations)
 - 32 GB recommended for a small library
 - Multi core processor (e.g. 4 CPUs with 3.3 GHz each)
- Kuali OLE early adopters
 - University of Chicago
 - 2 Dell PowerEdge M620 with 20 cores each, 128 and 64 GB RAM, 800 GB SSD
 - Lehigh University
 - IBM x3550, 8 core Xeon ES-2667, 32 GB RAM (*as at September 22, 2014*)
 - SOAS
 - VM with 8 cores, 64 GB RAM

System requirements – Software

- Server
 - Operating system: Windows 7, Linux, e.g. Ubuntu (hbz, VZG, Chicago), Debian (Lehigh), RedHat (Chicago), CentOS (SOAS), SLES (hbz), OpenSuSE
 - Required software packages:
 - Java 7 RE
 - Tomcat 6/7
 - Database: MySQL 5.5/5.6, MariaDB or Oracle
- Client
 - Any popular web browser (e.g. IE, Firefox, Google Chrome)
 - JavaScript enabled
 - PDF viewer for printing (e.g. invoice, hold slip, routing slip)

Data Management

- Relational Database Management System (RDBMS)
- MySQL/MariaDB uses
 - InnoDB/XtraDB, supporting ACID-compliant transaction features and foreign keys
 - MyISAM for sequence tables and unique identifier tables
- About 1500 database tables

Table usage	OLE tables	Framework tables	Sum
Regular data	About 300	About 600	About 900
Sequence/unique identifier	About 300	About 300	About 600
Sum	About 600	About 900	

- REST interfaces, e.g. for title and item queries

Search Engine

(Public) Discovery

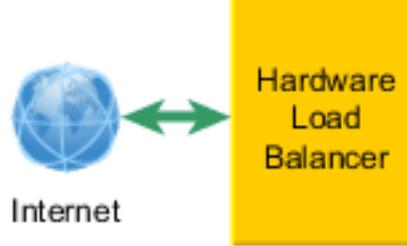
- Interface for any external discovery system
- DigiBib (hbz)
- VuFind (Chicago, Lehigh, SOAS, VZG)
- EBSCO Discovery Service

Internal Search for staff

- Based on Apache Solr, an open source search platform
- Provides
 - Full text search
 - Highlighting
 - Facet search
 - Dynamic clustering
 - Proprietary formats (e.g. Word, PDF)
- Written in Java

Scalability

Setup of the University of Chicago Library

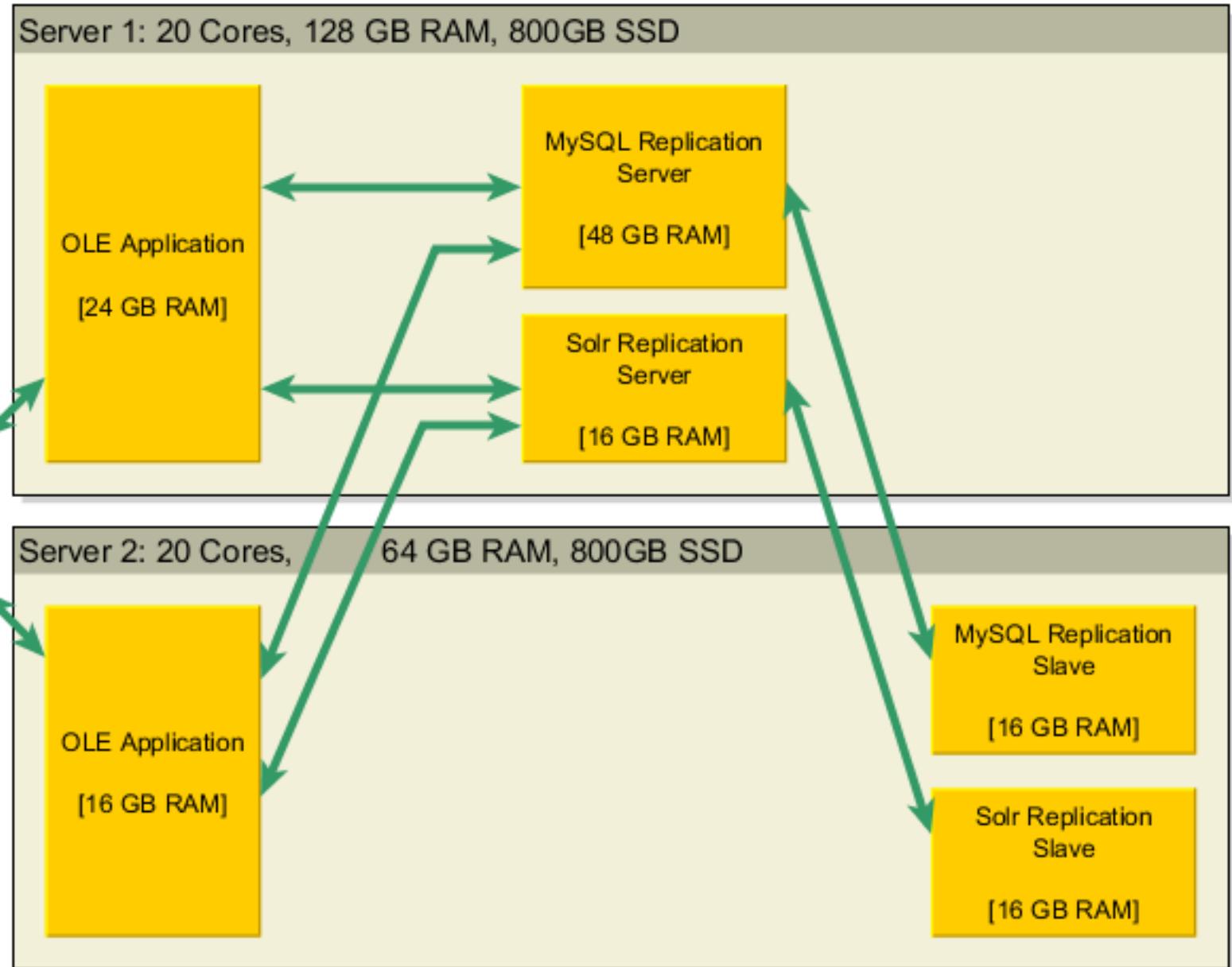


Write operations at replication servers.

Read operations at the replication slaves.

Source:

Dale Arntson (*University of Chicago Library*)
“OLE Deployment Architectures” at Kuali Days
November 12, 2014



Hosting, Cloud Computing and Multi-Tenancy

- Hosting possible
- Client Server System in daily use
- What is Cloud Computing?
 - “Ubiquitous network access to a shared pool of configurable computing resources”
(en.wikipedia.org)
 - Cost reductions and efficiency benefits compared to traditional hosting solutions
 - Prerequisites
 - Hosting possible 
 - Scalability 
 - Management tools

Multi-Tenancy

- Multi-Tenancy
 - Several libraries use the same software and hardware installation
 - Dynamic resource allocation
 - Access restricted to own data
- Agenda for OLE 4.0
 - Full cloud capability and multi-tenancy after completing
 - Tenant administration software and tenant separation
 - Cloud management software

Operating Schemes

Private Cloud

- Administration by a library service centre (e.g. hbz/VZG)
- Administration by a commercial affiliate

Local instance

- Administration by the library or the university's IT department
- Administration by a commercial affiliate
 - Hardware on campus or remote

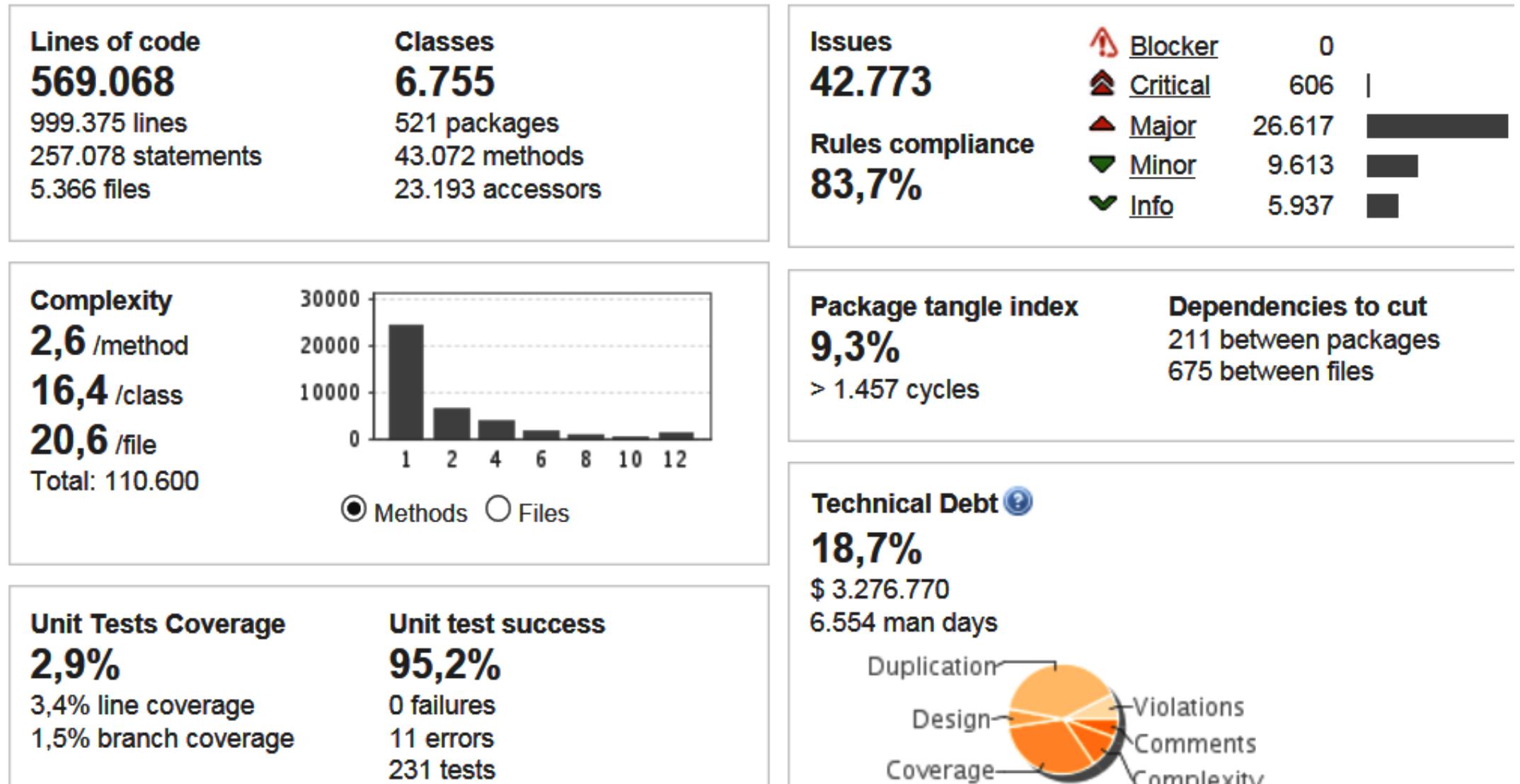
Public development

- Sonar – software metrics
<http://sonar.kuali.org/dashboard/index/136042>
- Latest code changes
<https://fisheye.kuali.org/changelog/ole>
- Ticket system for enhancements requests and bugs
<https://jira.kuali.org/browse/OLE>

Public development – OLE's software metrics by Sonar

Version 1.5.13-SNAPSHOT - 25. Aug 2015 04:27

Time changes...



Code Quality

- Agenda for improvements
 - Hire software architect
 - Code reviews
 - Use GitHub (currently Subversion/Fisheye/Crucible)
- Code has room for improvements
 - Source code documentation
 - Error handling, debugging
 - Unit test coverage
 - Some code is unnecessary complicated

Public Installations

- Demo installations, try it out!
- kuali.org
 - OLE 1.6: <http://tst.ole.kuali.org/> <http://dev.ole.kuali.org/>
 - OLE 2.0: <http://qa.ole.kuali.org/> <http://staging.ole.kuali.org/>
- hbz and VZG
 - <http://ole.gbv.de/> (Ubuntu 14.04 LTS, 4 GB RAM)
 - Configured for University Library of Hildesheim
 - With title, instance and item data
 - <http://kuali.hbz-nrw.de/> (Ubuntu 12.04 LTS, 48 GB RAM, 8 vCPUs, 1 TB HD)
 - Configured for University Library of Wuppertal
 - With title, instance and item data

Licence

Allowed and free of charge:

Run, copy, modify and distribute the software

Patent clause

Viral: All other modules of the software must also be under the same licence

The changed source code must be provided to

- the recipient of the binary program
- the user of the binary program (SaaS user)

Apache ECL GPL AGPL

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	●		
		●	●

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Licence

Educational Community Licence ECL 2.0 (for OLE prior to OLE 3.0)

- Based on Apache license 2.0
- Only difference: Patent clause, suitable for academic institutions
- Open Source: Run, copy, modify and distribute the software without charge
- Source code must show who changed the code and must be accompanied by the licence text
- No restrictions for software binaries – ECL code may be incorporated into proprietary code where only binaries are published.

Licence

AGPL (Affero General Public Licence) – from OLE 3.0 onwards

- Based on GNU General Public License (GPL) 3.0
- “Copyleft”, “Viral licensing”:
Any program that contains some AGPL code must be under AGPL.
- Any user of a software has the right to get the source code even if the software runs on some remote host and is used only over computer networks.
 - This is different from GPL where network users doesn't have this right (application service provider “loophole”).
- Making the source code available to all users
 - Prevents software add-ons that only a single software hoster offers (no monopoly, no vendor lock-in)
 - Enables further community driven development.

Internationalization

Internationalization is designing a software in a way that make adoptions of the software to different countries easy.

Localization is adapting an internationalized software to a specific country.

Internationalization

- Translation of texts in software and documentation (planned)
- Validation of phone numbers and postal codes – done ✓
- Date format – partly done (✓)
- Currency format and symbol – done ✓
- Number format (decimal mark, digit grouping separator) (planned)

Localization

- United Kingdom – done ✓

Thank you.

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Sources:

Slide 2

Overall Image „Equation of Images“: Ingolf Kuss

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