Achieving Better Buying Power through Acquisition of Open Architecture Software Systems for Web-Based and Mobile Devices

Walt Scacchi and Thomas Alspaugh
Institute for Software Research
University of California, Irvine
Irvine, CA 92697-3455 USA

Overview

- Recent trends in open architecture (OA) software systems
- Emerging challenges in achieving Better Buying Power (BBP) via OA software systems for Web-based and Mobile devices
- New practices to realize cost-effective acquisition of OA software systems
- Conclusions

Recent trends in OA software systems

- Multi-party acquisition and OA development ecosystems
- Shared development of Apps and Widgets as OA system components and capabilities
- Growing diversity of challenges in cybersecurity
- New business models for OA software component development and use

Multi-party acquisition and OA development ecosystems

A sample elaboration of producers (vendors), software component applications, and IP licenses for assembling OA system capabilities.

Multi-party acquisition of assembled capabilities within OA development ecosystems

Mobile Reciprocity

Consumer/End-User Organizations seeking ways to reduce acquisition cost and effort through shared development/use of common OA software system components (proprietary/open source Apps, Widgets).
Shared development of Web-based Apps and Widgets as OA system components

Widget Framework for Web-based PCs

Shared development of Mobile Apps and Widgets as OA system components

Ozone Widget Framework for Mobile Devices

Assemble capabilities using Apps/Widgets from trusted parties via sharing agreements

Widgets available within App Store

Commercial Mobile Apps also being used

(enterprise middleware services, not shown)

Multi-party acquisition and OA development ecosystems: Multiple OA system evolution paths

Enterprise-to-Mobile Middleware IP Licenses
(for the NitroDesk Touchdown (2014 version))

* LGPL 2.1
* Ical4j from Ben Fortuna
* Public Domain Declaration
* Apache 2
* The Legion of the Bouncy Castle
* Creative Commons BY
* Sony Mobile
* Jesse Anderson
* OpenSSL
* Apple Non-Exclusive
* SQLlite
* Microsoft Public License

IP and cybersecurity requirements will need continuous attention!
Shared development of Apps and Widgets as OA system components: Cybersecurity?

Growing diversity of challenges in cybersecurity


New business models for acquisition of OA Web/mobile software components

- Franchising
- Enterprise licensing
- Metered usage
- Advertising supported
- Subscription
- Free component, paid service fees
- Federated reciprocity for shared development
- Collaborative buying
- Sponsorship
- Donation
- (Government) open source software and others

Emerging challenges in achieving BBP via OA Web/mobile software systems

- Failure to understand software IP and cybersecurity obligations and rights propagation can reduce DoD buying power, increase software life cycle costs, and reduce competition.
- DoD and other Government agencies would financially and administratively benefit from engaging the development and deployment of an (open source) automated software obligations and rights management system (SORMS) for the acquisition workforce.
- Acquisition program managers/staff may not understand how software IP licenses affect OA system design, and vice-versa.
- Software IP and cybersecurity obligations and rights propagate across system development, deployment, and evolution activities in ways not well understood by system developers, integrators, end-users, or acquisition managers.

Emerging challenges in achieving BBP via OA Web/mobile software systems

- Acquisition program managers/staff may not understand how software IP licenses affect OA system design, and vice-versa.
- Software IP and cybersecurity obligations and rights propagate across system development, deployment, and evolution activities in ways not well understood by system developers, integrators, end-users, or acquisition managers.

New practices to realize cost-effective acquisition of OA software systems

- Need to R&D worked examples of reference OA system models, assembled capabilities, and component evolution alternatives.
- Need open source models of app/widget security assurance processes and reusable cybersecurity requirements.
### New practices to realize cost-effective acquisition of OA software systems

- Need precise **domain-specific languages** (DSLs) and **automated analysis tools** for continuously assessing and continuously improving cybersecurity and IP requirements for OA C2 systems composed from apps/widgets.
  - Need a **software obligations and rights management system (SORMS)** to streamline Web/mobile software component acquisition

### Conclusions

- Our research identifies how new Web/mobile software component technologies, IP and security requirements, and new business models interact to drive-down or drive-up acquisition costs.
- Managing acquisition costs for OA Web/mobile software components will be demanding.
- Acquisition workforce will need automated assistance, else acquisition process costs will dominate development costs for OA Web/mobile software components!

### Conclusions

- New technical risks for component-based OA software systems can dilute the cost-effectiveness of BBP efforts.
- Need R&D leading to automated systems (SORMS) that can model and analyze OA system IP licenses and cybersecurity requirements
  - SORMS will empower the acquisition workforce, and
  - Identify and manage cost-effectiveness trade-offs

### Acknowledgements

This material is based upon work supported by the Naval Postgraduate School Acquisition Research Program under Grants No. N00244-14-1-0030 and N00244-1-15-0010. This material also benefits from discussions with the Assembled Capabilities Working Group, OUSD (AT&L) C3CB.

The views expressed in materials or publications, and/or made by the presenters, do not necessarily reflect the official policies of the Naval Postgraduate School or any other group, nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government.