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Christopher J. Mackie
Associate Program Officer
The Andrew W. Mellon Foundation

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ENTERPRISE SERVICES ARCHITECTURES AND THE LIBRARY: A VIEW FROM I.T.

- The views expressed in this presentation are my own, not necessarily those of my colleagues or The Andrew W. Mellon Foundation

ABSTRACT

- ESA's create significant new opportunities and pose significant new challenges for higher education and research libraries.
- To overcome those challenges and exploit those opportunities, it's useful to understand the problems ESAs purport to solve--as well as those they don't.
- Foremost among those opportunities and challenges is the need for Libraries and IT to work more closely together than most do today.

INSTITUTIONAL TRENDS

- Internal IT capacity is declining
  - Demand is increasing faster than budget
  - Staff are aging; labor markets are inhospitable
  - Home-brew enterprise software is growing too expensive to build or maintain
  - Software development & maintenance capacity is vanishing; vendor dependence is increasing
  - *Academic IT is looking more like Library IT…*
- Application Overburden
  - $heer number of applications
  - Incompatible stack$
  - Adoption & integration challenge$
  - ilo

CYBERINFRASTRUCTURE'S CHALLENGE

- The NSF vision is powerful and plausible
- Only one problem: what if it *works*…?
- *"Don't do anything great unless you are prepared to survive the celebration."* – John Madden
- We should plan now for the transition from term-limited NSF project support to sustainable institutional support
- Without a transition plan, costs will go up, adoption down; sustainability (on a broad basis) may not be possible
- Libraries with less IT capacity buffer are correspondingly more vulnerable

SUSTAINING CAMPUS INFRASTRUCTURE

- Adoption, maintenance costs must be kept to a minimum
  - Minimize number of stacks
  - Minimize number of org silos
- Software must integrate/interoperate smoothly with existing infrastructure
  - AuthN/AuthZ/IdM
  - Workflow, UI
  - Academic systems (LMS, calendaring, etc.)
  - Admin systems (ERP, HR, student, research admin)
  - ***Library systems (ILS, OPAC, VRE, etc.)***
- Important for enterprise integration today, and growing
- *We don't want Sophie's choice*

WHY SOA?

- Composability/Reuse
- Flexibility/Loose Coupling
- Scalability/Affordability
- Standards-based/Openness
- Malleability to organizational processes:
  "Get the technology out of the way"

WHY *NOT* SOA?

- Managerial challenges
  - Need to understand your business processes
- Bottom-up strategy is dubious
  - SOApps reinvent your problems at new levels of intractability
  - Fragmented services work fine for personal passion, monetization, but not as well for institutional efficiency, sustainability
    - Scalability/load-balancing
    - Finger-pointing
    - Unanticipated side-effects

THE SOA CHALLENGE

- It's no big secret that Web services introduce the potential for enterprise-centric interoperability. But to realize their reuse potential requires that broad support for … [ESA infrastructure] … already be in place. The broader the support, the greater the opportunity for repeated reuse. Without this level of support, services can only be accessed by consumer programs within "pocket domains" and can therefore not even get close to realizing meaningful ROI.

  -- SOAMag.com, Issue XI, 2007/10

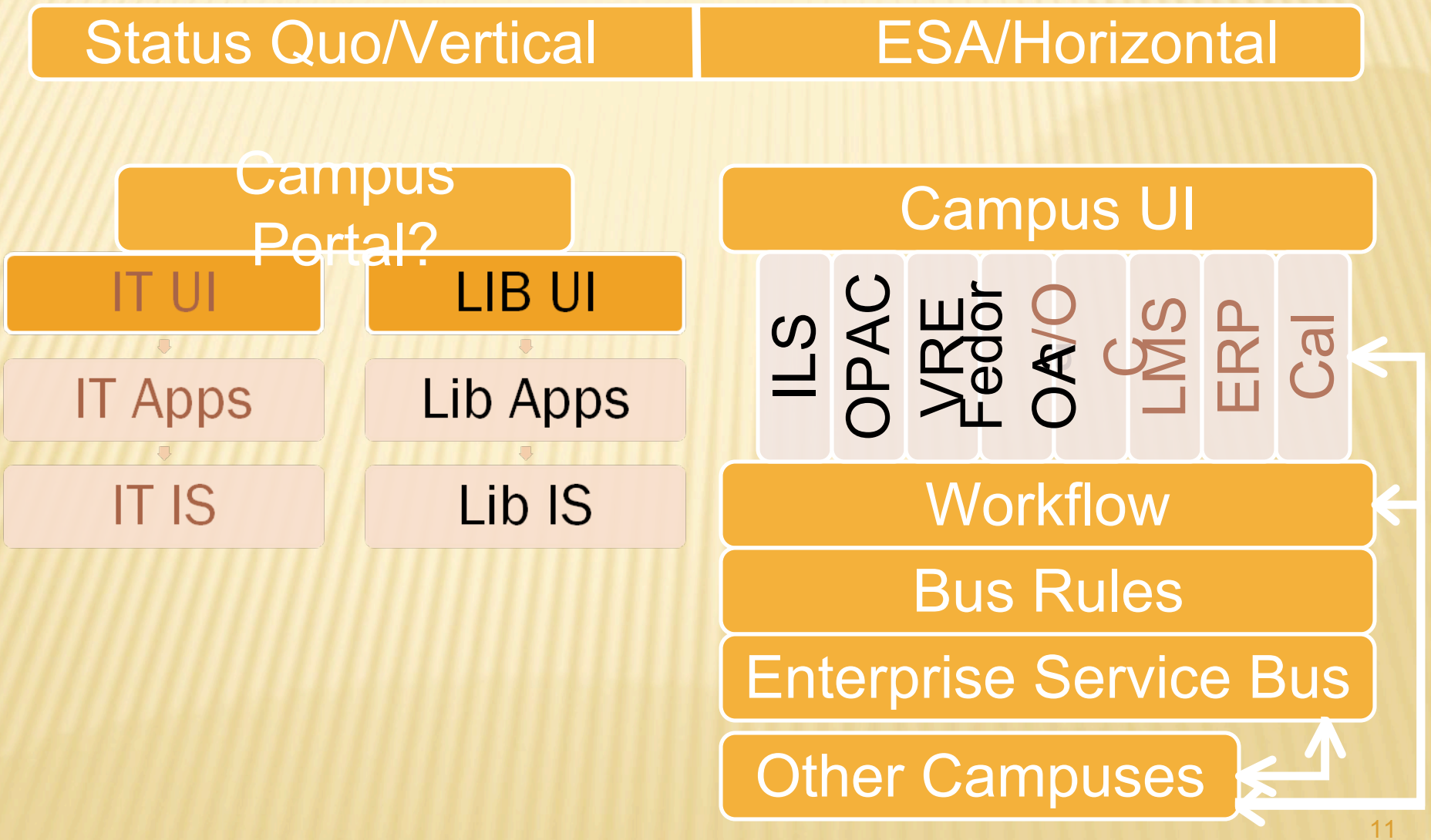
- Will enterprises resolve their current architectural challenges, allowing SOA to become the predominant approach to Enterprise Architecture worldwide? Or will it succumb to the pressures of confusion, misdirection, and ignorance that assail it, and become a tired label that signifies little more than a set of product features? We've seen this sad conclusion before with Enterprise Application Integration -- once a promising architectural approach, now a euphemism for expensive, inflexible integration middleware. Will SOA suffer the same fate?

  –ZapThink.com, 2007/10/01

ENTERPRISE SERVICES ARCHITECTURES

- The practice of SOA in a nurturing ecosystem that encompasses the enterprise
  - Focus on institutions, not individuals or the "cloud"
  - Address security, other institutional concerns
  - Emphasize process modeling, proper relationships among design, technology, and management
- What *is* the enterprise? Library? Campus? HE?

ESA: FROM VERTICAL TO HORIZONTAL



A WORD ABOUT "THE CLOUD"....

- "Computing in the Cloud" is all the rage right now, but…
  - Everything lives somewhere
  - Somebody must pay for it
  - Proprietary ownership is a risk
  - Privacy issues are risks, too
- Use the cloud, but don't let it own you
  - Be prepared to get your data back at any time
  - Build p2p fallbacks into your ESA: in case the entire model fizzles, peered campus ESAs can emulate the cloud
- *Remember, clouds are mostly vapor….*

AND ABOUT SUSTAINABILITY….

- Goal: make ESA adoptable and sustainable for the widest possible number and variety of higher education institutions
- Four strategies
  - Bring the right people to the table
  - Seek common foundations
  - Embrace openness and standards
  - Merge infrastructures prospectively

BRING THE RIGHT PEOPLE

- *If you build it, they will not come…inside or outside the org.*
  - Economic/technological/pragmatic barriers
  - Emotional barriers (NIH syndrome, status competition, turf/ego)
- All relevant stakeholders must help design/operate/govern
  - CIO/IT (*in addition to* CS)
  - Provost & faculty researchers/teachers
  - Libraries
  - Commercial vendors
- Diversity of design community is key; so is representativeness
  - *If we build it, we're already there.*
- FOSS is another key: What incentives do proprietary vendors have to build truly interoperable ESAs?

DO YOU NEED A(N OSS) FRAMEWORK?

- Technologically, no
  - One can build “pure” SOA without any common tech underlayer (e.g., Google Maps & Google Search)
  - But sysadmin, IdM, clustering, statefulness, other functions all benefit from supporting infrastructure, esp. at scale
  - Org complexity also dictates frameworks: past a certain scale, they’re just more efficient
- Organizationally, yes
  - You can’t manage what you can’t measure
  - You can’t govern anarchy
- Pragmatically, yes again
  - Commercial “SOA Stacks” frame the conversation
  - Without an OSS alternative, proprietary solutions will rule

THE ZEN OF ESA IN HIGHER EDUCATION

- Provide agile, commercial quality FOSS alternatives to monolithic, locked-in commercial SOA stacks, but…
  - Play *very* nicely with all vendors who support OSS models
- Emphasize transformational aspects of SOA, but…
  - Provide incremental paths for institutions not there yet
- Focus relentlessly on institutional-level sustainability, but….
  - Design for all of higher education, worldwide
- Build institutional and global infrastructure, but…
  - Emphasize user-level functionality
- Support “the cloud,” but…
  - Design and develop peer-to-peer fallbacks

MESA – MIDDLEWARE FOR ESAS

- Four middleware layers for NFP ESA
  - ESB (Q1 2008 alpha, www.kuali.org/student)
  - Business Rules Engine (JBOSS)
  - Workflow (Mellon/NSF Workshop 3-5 Oct 2007)
  - FLUID UI (Q4 2007 alpha, www.fluidproject.org)
- All open-source, product quality
- All will use open-standards interfaces
  - Can swap out pieces as better options emerge
  - Can mix and match commercial/OSS pieces
- Cross-domain "meta-ESA" for all of higher ed

MESA-FRIENDLY PROJECTS

- SEASR (laptop-to-grid-scale text/music/image/video mining & analysis) www.seasr.org
- FEDORA (Repository) www.fedora.info
- Kuali Suite (ERP, Research Admin, Student) www.kuali.org
- Sakai (LMS) www.sakaiproject.org
- *Evergreen ILS? www.open-ils.org*
- *Bedework? (event calendaring for insts/disciplines, www.bedework.org)*
- *Bamboo? (web services for the academic mission)*

LIBRARIES, I.T. ORGS, AND ESA

- ESA challenges libraries and IT to cooperate in new ways
  - Both will lose “silo” autonomy (in favor of collective self-governance of ESA)
  - Both can gain scope, constituents
    - IT can provide high-availability services for lib systems
    - IT can provide institutionally consistent user experience
    - Library can gain more control over (e.g.) repository services, scholarly content life cycle management
    - Library can reach broadly, deeply into academic mission
- Ideally, each group can specialize more productively in what it does best
- Done well, benefits may far outweigh costs

DOING ESA WELL: ADVICE FOR LIBRARIES

- Understand your business processes, deeply and well
- Be prepared to trade (some) autonomy for increased scope and mission-effectiveness, reduced costs, or both
- Look for opportunities to exploit the ESA to serve new customers, or serve existing customers in new ways
- Understand that ESA is not a framework, not an architecture, but an ongoing, iterative *process* of
  - Understanding one's organizational practices holistically
  - Using SOA to deliver technology effectively in support of those practices
  - Using institutional governance mechanisms to prevent the SOA from getting out of hand
- Engage with IT proactively: don't wait for IT to come

IN CLOSING: "A VIEW FROM IT"

- ESA is coming; it may already be at your door
- Global higher education is the right "enterprise" for ESA
  - Trading (some) autonomy for scope and effectiveness: Campuses have the same external tradeoffs that IT and the Library must make internally
  - Campuses that govern their ESAs well should generate a significant competitive advantage
- ESA works best when everyone does what they do best
  - Turf wars, ignorance can dramatically impair ESA effectiveness
  - Governed well, with proper horizontal specialization, ESAs can create a positive-sum game in which everyone is better-off
- Community design and governance is a more sustainable strategy than commercial lock-in

CONTACT INFORMATION

Christopher J. Mackie

Associate Program Officer,
Program in Research in Information Technology

The Andrew W. Mellon Foundation

cjm@mellon.org

cjmackie06 @ AIM

(609) 924-9424

http://rit.mellon.org