UH Applications Developers Meeting 08/03/2012

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Agenda

- Poll: UH Developers LISTSERV list
- Presentation: IT Security Policy Updates
- Presentation: UH Holiday Web Service
- Presentation: UHIMS Events (messaging)
- Presentation: CAS3, next gen Web Login Service
- Updates: Quick status updates

UH Developers LISTSERV list

- Previously we asked:
 - Establish an online forum for UH Developers? Jes



- Today we have uh-app-developers-l@lists.hawaii.edu
 - 112 UH developers and IT managers have joined; it has yet to evolve into a rich discussion forum.
- Next steps, fold in and shut down
 - uh-web-login-l@lists.hawaii.edu
 - uh-ldap@lists.hawaii.edu
- The goal is to create a single rich forum for discussion.
- Feedback?

Policies & Admin Procedures

- E2.214
- New Data Governance & Data Sharing policies draft
- FERPA revision underway: A7.022

E2.214: Changes

- Expansion of the philosophy of the policy to permit collection and retention of sensitive information only when absolutely required for University operations
- Applicability of the policy to all University departments regardless of funding, including RCUH service ordered projects
- Identification of specific concerns surrounding Social Security Numbers, Personal Financial Information (including of credit card transaction), and Student Information (FERPA breach reporting requirements)
- Mandatory reporting of all information systems with sensitive information (Annual Personal Information System Survey)

E2.214: Changes cont.

- Mandatory information security training for anyone with access to systems using sensitive information
- Requiring the inclusion of contract language in any contract or memoranda of agreements with 3rd party vendors or contractors to ensure protection of UH sensitive information
- Requiring registration of any general purpose UH server and scanning of these servers for both vulnerabilities and personally-identifiable information (PII)
- Inclusion of securing multi-function printers, copiers, scanners and fax machines as devices that have network connections and hard drives

Contract Language

- http://www.hawaii.edu/infosec/e2.214-contract-language.html
- INFORMATION SECURITY: Contractor agrees to comply with all applicable laws, regulations, and University policies, including, but not limited to, E2.210 (Use and Management of Information Technology Resources), E2.214 (Security and Protection of Sensitive Information), A7.022 (Procedures Relating to Protection of the Educational Rights and Privacy of Students), Hawaii Revised Statutes (HRS) 487J (Social Security Number Protection), HRS 487N (Security Breach of Personal Information), and HRS 487R (Destruction of Personal Information Records). In addition, Contractor shall implement appropriate measures designed to ensure the confidentiality and security of protected information, protect against any anticipated hazards or threats to the integrity or security of such information, and protect against unauthorized access to or use of such information that could result in substantial harm or inconvenience. Contractor also agrees that security breaches, or incidents shall be reported immediately to the University.

UH Executive Policy on Institutional Data Governance

- Data Stewards
 - Executive
 - Campus (senior administrators such as Vice Chancellors)
 - Authorize data sharing requests
 - System (managers of Institutional Data Systems)
 - Authorize data sharing requests
 - Authorize access to Institutional Data Systems
 - Functional
 - Subject matter experts (registrars, FAOs, PO/FO/AOs, IR, etc.)
 - Fulfill data sharing requests

Stewardship of UH System's Institutional Data Systems

Business Area(s)	Transactional or Reporting	Institutional Data System	System Executive Data Steward	UH Leadership
Finance	Transactional	Kuali Financial System – KFS	Director, Financial Management and Controller	VP for Budget and Finance/CFO
	Reporting	eThority	Director, Financial Management and Controller	VP for Budget and Finance/CFO
Human Resources	Transactional	PeopleSoft	System Director of Human Resources	Executive VP for Academic Affairs/Provost
	Reporting	HR Data Mart – HRDW	System Director of Human Resources	Executive VP for Academic Affairs/Provost
Research Administration	Transactional	myGrant (Kuali Coeus - KC)	Director, Office of Research Services	VP for Research
	Reporting	Cognos	Director, Office of Research Services	VP for Research
Student/Financial Aid	Transactional	Banner	Director, Academic Technology Services, Information Technology Services	VP for Information Technology & Chief Information Officer
	Reporting	Operational Data Store (ODS)	Director, Institutional Research and Analysis Office	Executive VP for Academic Affairs/Provost
	Transactional	STAR	UH Mānoa Vice Chancellor for Academic Affairs	Executive VP for Academic Affairs/Provost
	Reporting	STAR	UH Mānoa Vice Chancellor for Academic Affairs	Executive VP for Academic Affairs/Provost
Identity Management	Transactional	Identity Management System (IMS)	Manager of System Services, Technology Infrastructure, Information Technology Services	VP for Information Technology & Chief Information Officer

UH Administrative Policy on Data Sharing (new)

- 3 Types of Data Sharing Requests
 - 1) No approval requires
 - To meet compliance, accreditation, audit requirements
 - Requests from senior administrators as part of their daily business requirements
 - Record level data being shared under previously established MOAs
 - Requests that originate within a campus for its own campus' data

AND, does NOT involve sensitive information AND, is less than 500 individual records

UH Administrative Policy on Data Sharing (new)

- 2) Campus Executive Data Steward Approval Required
 - Requests that originate within a campus for its own campus' data AND involves sensitive information
 - Requests that originate within a campus for its own campus' data AND involves 500 or more individual records

UH Administrative Policy on Data Sharing (new)

- 3) System Executive Data Steward Approval Required
 - Requests that pertain to more than one campus AND involves sensitive information
 - Requests that pertain to more than one campus AND involves
 500 or more individual records
 - Requests that involve a data link
 - Requests that involve a third party vendor or UH affiliates
- Development of a centralized, online data request process

UH Administrative Policy on FERPA

- Updates include:
 - Changes in federal regulations
 - Addition of language allowing educational research
 - Alignment with administrative policy data sharing

IT Security Policy Updates

<http://www.hawaii.edu/infosec/>



UH Holiday Web Service

- New Year's Day (Federal, UH, Bank)
- Martin Luther King Jr. Day (Federal, UH, Bank)
- President's Day (Federal, UH, Bank)
- Prince Kuhio Day (State, UH)
- Good Friday (UH)
- Memorial Day (Federal, UH, Bank)
- King Kamehameha Day (State, UH)
- Independence Day (Federal, UH, Bank)
- Statehood Day (State, UH)
- Labor Day (Federal, UH, Bank)
- Columbus Day (Federal, Bank)
- Veteran's Day (Federal, UH, Bank)
- Thanksgiving (Federal, UH, Bank)
- Christmas (Federal, UH, Bank)
- Election Day (Federal, UH, Bank)

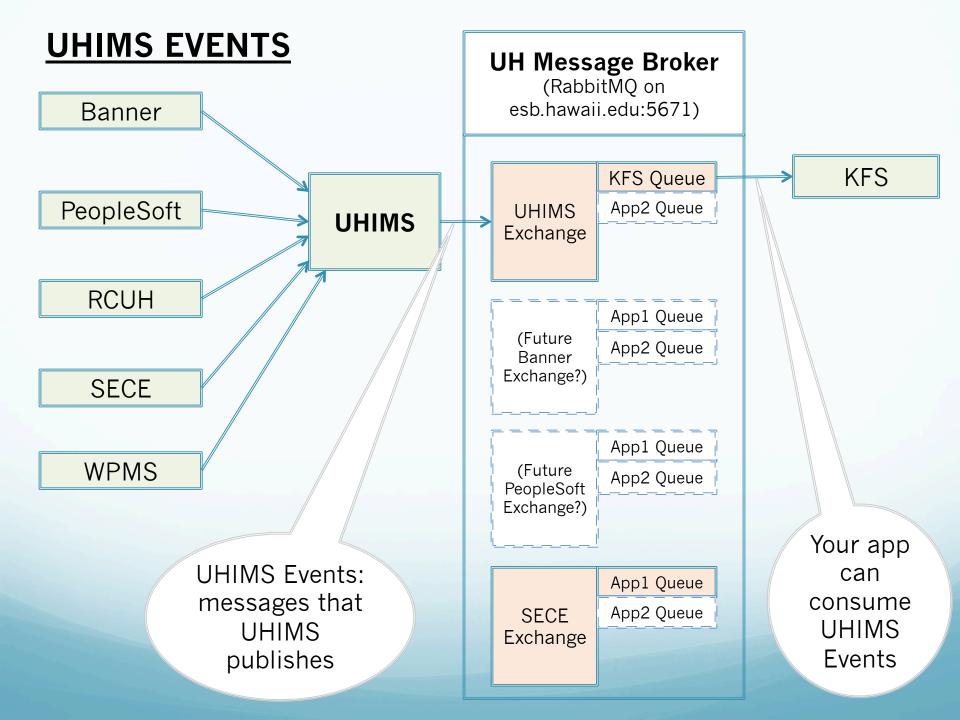
UH Holiday Web Service

- List<String> getHolidayTypes()
- boolean isHoliday(Date date, boolean isObserved, Optional String type)
- Holiday getClosestHoliday(Date date, boolean searchForward, boolean isObserved, Optional String type)
- List<Holiday> getHolidaysInMonth(Date month, boolean isObserved, Optional String type)
- List<Holiday> getHolidaysInYear(Date year, boolean isObserved, Optional String type)
- List<Holiday> getHolidaysInRange(Date startDate, Date endDate, boolean includeStartAndEnd, boolean isObserved, Optional String type)

UH Holiday Web Service

- Documentation is posted on bwiki: https://www.hawaii.edu/bwiki/display/ITSWS/Holiday+Web+Service
- Suggestions and comments: cahana@hawaii.edu





- Person
 - <addPerson>
 - <modifyPersonUhuuid>
 - <modifyPersonFullName>
 - <modifyPersonDisplayName>
 - <deletePerson>
- Affiliation
- Username
- Email
- Contact Info

- Person
- Affiliation
 - <addAffiliation>
 - <deleteAffiliation>
 - <modifyAffiliation>
- Username
- Email
- Contact Info

- Person
- Affiliation
- Username
 - <addUsername>
 - <modifyUsernameUid>
 - <modifyUsernameUhUuid>
 - <modifyUsernameDisplayName>
 - <modifyUsernameAccess>
 - <deleteUsername>
- Email
- Contact Info

- Person
- Affiliation
- Username
- Email
 - <addEmail>
 - <deleteEmail>
- Contact Info

- Person
- Affiliation
- Username
- Email
- Contact Info
 - <addContactInfo>
 - <modifyContactInfo>
 - <deleteContactInfo>

Person (identity) messages:

<messageData>

<uhUuid>

(non-empty)

Person (identity) messages:

<modifyPersonUhUuid>

```
<messageData>
       <uhUuid>
                       (non-empty)
   <messageDataBefore>
       <uhUuid>
                       (non-empty)
<modifyPersonFullName>
   <messageData>
       <firstName>
                       (must provide, even if value happens to be empty)
       <fullName>
                       (non-empty)
       <lastName>
                       (must provide, even if value happens to be empty)
                       (must provide, even if value happens to be empty)
       <middleName>
                       (must provide, even if value happens to be empty)
       <nameSuffix>
       <uhUuid>
                       (non-empty)
```

Affiliation messages:

```
<affiliation> (data specs, not a message)
        <affID>
                              (non-empty)
        <campusKey>
                              (optional)
        <dataOrigin>
                              (non-empty)
                              (optional)
        <eac>
                              (optional)
        <employeeRecord>
        <employeeStatus>
                              (optional)
                              (optional)
        <employeeTypeCode>
                              (non-empty)
        <org>
        <positionNumber>
                              (optional)
        <role>
                              (non-empty)
        <uhUnitCode>
                              (optional)
```

Affiliation messages:

<role>

```
<affiliation> (data specs, not a message)
        <affID>
                              (non-empty)
                               (optional)
        <campusKey>
        <dataOrigin>
                              (non-empty)
                              (optional)
        <eac>
                              (optional)
        <employeeRecord>
        <employeeStatus>
                              (optional)
        <employeeTypeCode>
                              (optional)
                              (non-empty)
        <org>
```

(optional)

(optional)

(non-empty)

<positionNumber>

<uhUnitCode>

```
*** VALUES FOR <org> ***
                           (orgCategory
<org>
                   in message routing key)
                                other
etc
                                other
ewc
                               hawcc
hawcc
hcc
                                  hcc
                              kauaicc
kauaicc
kcc
                                  kcc
lcc
                                   lcc
mauicc
                              mauicc
mhpcc
                                other
other
                                other
rcuh
                                 rcuh
uh
                                   uh
uhf
                                other
uhh
                                 uhh
uhm
                                 uhm
uhs
                                other
uhsystem
                            uhsystem
uhwo
                                uhwo
WCC
                                  WCC
```

Affiliation messages:

<affiliation> (data specs, not a message)

<affID> (non-empty) <campusKey> (optional) <dataOrigin> (non-empty) (optional) <eac> (optional) <employeeRecord> <employeeStatus> (optional) <employeeTypeCode> (optional) (non-empty) <org> <positionNumber> (optional) <role> (non-empty) <uhUnitCode> (optional)

*** VALUES FOR <role> ***

faculty.communityCollege faculty.countyAgent faculty.courseInstructor faculty.emeritus faculty.graduateAssistant.overload faculty.law faculty.lecturer faculty.lecturer.casual faculty.lecturer.overload faculty.librarian faculty.medical faculty.noDetails faculty.noDetails.casual faculty.noDetails.overload faculty.researchAssistant faculty.researcher faculty.specialist faculty.teachingAssistant faculty.university	faculty
nonCreditStudent.etc nonCreditStudent.noDetails	other student
Ohana	other
other	other
preStudent.accepted preStudent.financialAid preStudent.noDetails	other other other

Affiliation messages:

<affiliation> (data specs, not a message)

<affID> (non-empty) <campusKey> (optional) <dataOrigin> (non-empty) (optional) <eac> (optional) <employeeRecord> <employeeStatus> (optional) <employeeTypeCode> (optional) (non-empty) <org> <positionNumber> (optional) <role> (non-empty) <uhUnitCode> (optional)

*** VALUES FOR <role> ***</role>	
•	Category
in message ro	uting key)
retiree	other
staff.apt	staff
staff.apt.casual	staff
staff.apt.overload	staff
staff.civilService	staff
staff.executive	staff
staff.executive.casual	staff
staff.noDetails	staff
staff.noDetails.casual	staff
staff.noDetails.overload	staff
staff.nonCompensated	staff
student.graduate.law	student
student.graduate.medical	student
student.graduate.noDetails	student
student.other.apprenticeship	student
student.other.continuingEducation	
student.other.postBaccalaureate	student
student.other.professional	student
student.other.undeclared	student
student.other.vocational	student
student.undergraduate.noDetails	student
studentEmployee.studentHire	other
studentEmployee.workStudy	other

*** VALUES FOR <role> ***

Affiliation messages:

<affiliation> (data specs, not a message)

<affID> (non-empty)
<campusKey> (optional)
<dataOrigin> (non-empty)
<eac> (optional)
<employeeRecord> (optional)

<employeeStatus> (optional)
<employeeTypeCode> (optional)

<org>
<postionNumber>
<role>
(non-empty)
(optional)

(non-empty)
(non-empty)
(optional)

*** VALUES FOR <dataOrigin> *** <dataOrigin> (dataOriginCategory in message routing key) hris hris rcuh rcuh scopis scopis sece other sis sis uhims other

Affiliation messages:

```
<addAffiliation>
   <messageData>
       <affiliation>
                               (contains one of <affiliation>) (non-empty)
       <uhUuid>
                                (non-empty)
       <remainingAffiliations> (must provide, even if empty)
       <remainingAffiliationCount> (non-empty)
<deleteAffiliation>
   <messageData>
       <affiliation>
                               (contains one of <affiliation>) (non-empty)
       <uhUuid>
                                (non-empty)
       <remainingAffiliations> (must provide, even if empty)
       <remainingAffiliationCount> (non-empty)
```

```
<modifyUsernameUid>
   <messageData>
      <uid>
                    (non-empty)
   <messageDataBefore>
      <uid>
                    (non-empty)
<modifyUsernameUhUuid>
   <messageData>
      <uhUuid>
                    (non-empty)
                    (non-empty)
      <uid>
   <messageDataBefore>
      <uhUuid>
                    (non-empty)
```

Contact Information messages (currently comes from WPMS):

```
<contactInfo> (data specs, not a message)
    <contactInfoID>
                       (non-empty)
    <deptName>
                        (must provide, even if value happens to be empty)
    <emailsAsEntered> (must provide, even if value happens to be empty)
                       (contains zero or more of <phone>,
    <faxes>
                        must provide, even if value happens to be empty)
                        (must provide, even if value happens to be empty)
    <faxesAsEntered>
    <officeLocation>
                        (must provide, even if value happens to be empty)
    <orgName>
                        (must provide, even if value happens to be empty)
                        (contains zero or more of <phone>,
    <phones>
                        must provide, even if value happens to be empty)
    <phonesAsEntered>(must provide, even if value happens to be empty)
                        (must provide, even if value happens to be empty)
    <title>
    <uhUuid>
                        (non-empty)
    <website>
                        (must provide, even if value happens to be empty)
```

Contact Information messages (currently comes from WPMS):

```
<phone> (data specs, not a message)
  <phoneAsEntered> (must provide, even if value happens to be empty)
  <phoneInfoPrefix> (must provide, even if value happens to be empty)
  <phoneNumber> (must provide, even if value happens to be empty)
```

Contact Information messages (currently comes from WPMS):

```
<addContactInfo>
    <messageData>
         <contactInfo>
                                      (contains one of <contactInfo>, non-empty)
         <remainingContactInfo>
                                      (contains zero or more of <contactInfo>,
                                       must provide, even if value happens to be empty)
         <uhUuid>
                                      (non-empty)
<modifyContactInfo>
    <messageData>
         <contactInfo>
                                      (contains one of <contactInfo>, non-empty)
         <remainingContactInfo>
                                      (contains zero or more of <contactInfo>,
                                       must provide, even if value happens to be empty)
         <uhUuid>
                                      (non-empty)
<deleteContactInfo>
     <messageData>
         <contactInfo>
                                      (contains one of <contactInfo>) (non-empty)
         <remainingContactInfo>
                                      (contains zero or more of <contactInfo>,
                                       must provide, even if value happens to be empty)
         <uhUuid>
                                      (non-empty)
```

What if only interested in some messages?

Message	9
---------	---

<addPerson>

<modifyPerson*>

<deletePerson>

Message Routing Key

person.add

person.modify

person.delete

<addAffiliation>

<deleteAffiliation>

<modifyAffiliation>

affiliation.add.{roleCategory}.{orgCategory}.{dataOriginCategory} affiliation.delete.{roleCategory}.{orgCategory}.{dataOriginCategory} affiliation.modify.{roleCategory}.{orgCategory}.{dataOriginCategory}

<addUsername>

<modifyUsername*>

<deleteUsername>

username.add

username.modify

username.delete

<addEmail>

<deleteEmail>

email.add

email.delete

<addContactInfo>

<modifyContactInfo>

<deleteContactInfo>

contactInfo.add

contactInfo.modify

contactInfo.delete

What if only interested in some messages?

Message

<addPerson>

<modifyPerson*>

<deletePerson>

<addAffiliation>

<deleteAffiliation>

<modifyAffiliation>

<addUsername>

<modifyUsername*>

<deleteUsername>

<addEmail>

<deleteEmail>

<addContactInfo>

<modifyContactInfo>

<deleteContactInfo>

Message Routing Key

person.add person.modify person.delete

affiliation.add.{roleCategory}.{orgCategory}.{dataOriginCategory} affiliation.delete.{roleCategory}.{orgCategory}.{dataOriginCategory} affiliation.modify.{roleCategory}.{orgCategory}.{dataOriginCategory}

username.add username.modify username.delete

email.add email.delete

contactInfo.add contactInfo.modify contactInfo.delete



(RabbitMQ on esb.hawaii.edu: 5671)

UHIMS App2 Queue
Exchange App3 Queue

(all messages)

KFS

(# = zero or more segments, * = one segment)

App2

*.delete.# (only delete messages)

App3

affiliation.#.hris (only aff data from HR)

More affiliation bindings:

```
MessageMessage Routing Key(# = zero or more segments, * = one segment)<addAffiliation>affiliation.add.{roleCategory}.{orgCategory}.{orgCategory}.{dataOriginCategory}<deleteAffiliation>affiliation.delete.{roleCategory}.{orgCategory}.{dataOriginCategory}<modifyAffiliation>affiliation.modify.{roleCategory}.{orgCategory}.{dataOriginCategory}
```

```
{roleCategory}.{orgCategory}.{dataOriginCategory}
    where
        {roleCategory} is one of:
            faculty staff student other
        {orgCategory} is one of:
            uhsystem uhm uhh uhwo hawcc hcc kauaicc kcc lcc mauicc wcc uh rcuh other
        {dataOriginCategory} is one of:
            sis hris scopis rcuh other
```

Binding Pattern	Description
affiliation.*.faculty.uhm.hris, affiliation.*.staff.uhm.hris	Multiple bindings, only interested in UH Manoa faculty/staff whose data comes from PeopleSoft (skips Banner definition of faculty)
affiliation.delete.*.kcc.*	Any possible affiliation termination associated with Kapiolani CC

Deprovisioning: rely on <deleteAffiliation> instead of <deleteUsername>

- UHIMS implements a username lifecycle that is not typical for most apps:
 - Student affiliations linger an extra semester
 - Grace period of six months
 - A six-month ohana affiliation begins after last affiliation is gone.
 - This ohana affiliation must be renewed every year
 - <deleteUsername> message only sent after ohana affiliation not renewed.
- Pay attention to <deleteAffiliation>
 - <remainingAffiliations>
 - <remainingAffiliationCount>

Catching up on prerequisite data:

- Initial load
- Retrofit messages (precedes each add message)

```
<retrofitPerson>
                        (message routing key: person.retrofit)
     <messageData>
          <actions>
                        (contains one or more of <addPerson> messages) (non-empty)
<retrofitUsername>
                        (message routing key: username.retrofit)
     <messageData>
          <actions>
                        (contains one or more of <addUsername> messages) (non-empty)
<retrofitFmail>
                        (message routing key: email.retrofit)
     <messageData>
          <actions>
                        (contains one or more of <addEmail> messages) (non-empty)
<retrofitContactInfo>
                        (message routing key: contactInfo.retrofit)
     <messageData>
          <actions>
                        (contains one or more of <addContactInfo> messages) (non-empty)
```

Idealistic View:

UHIMS Banner PeopleSoft SECE **RCUH WPMS**

UH Message Broker (RabbitMQ on esb.hawaii.edu:5671)

UHIMS Exchange

Banner Exchange

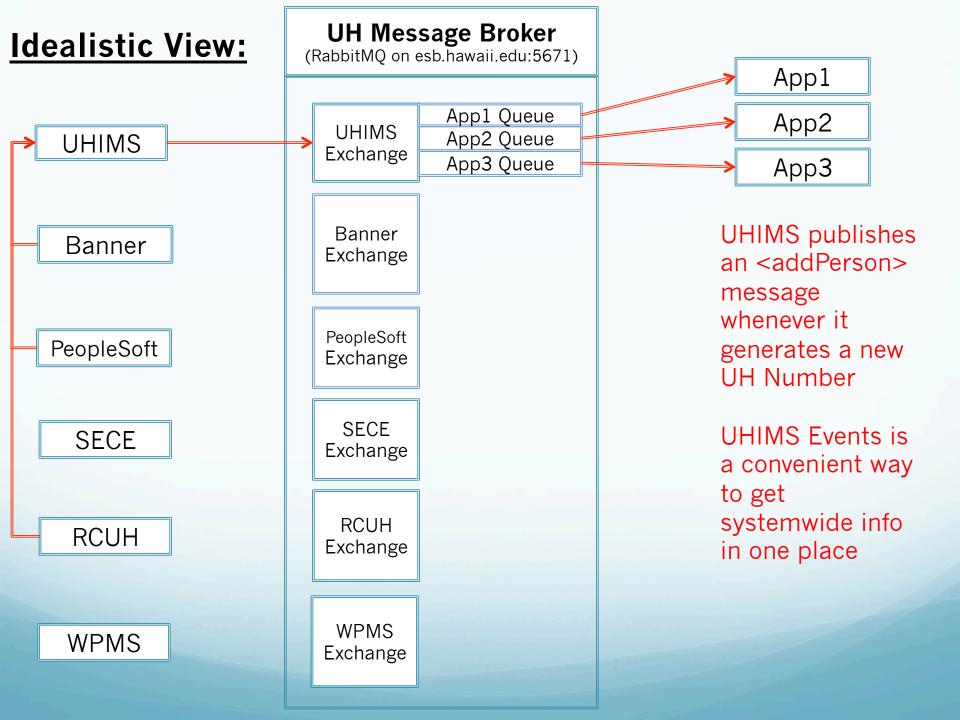
PeopleSoft Exchange

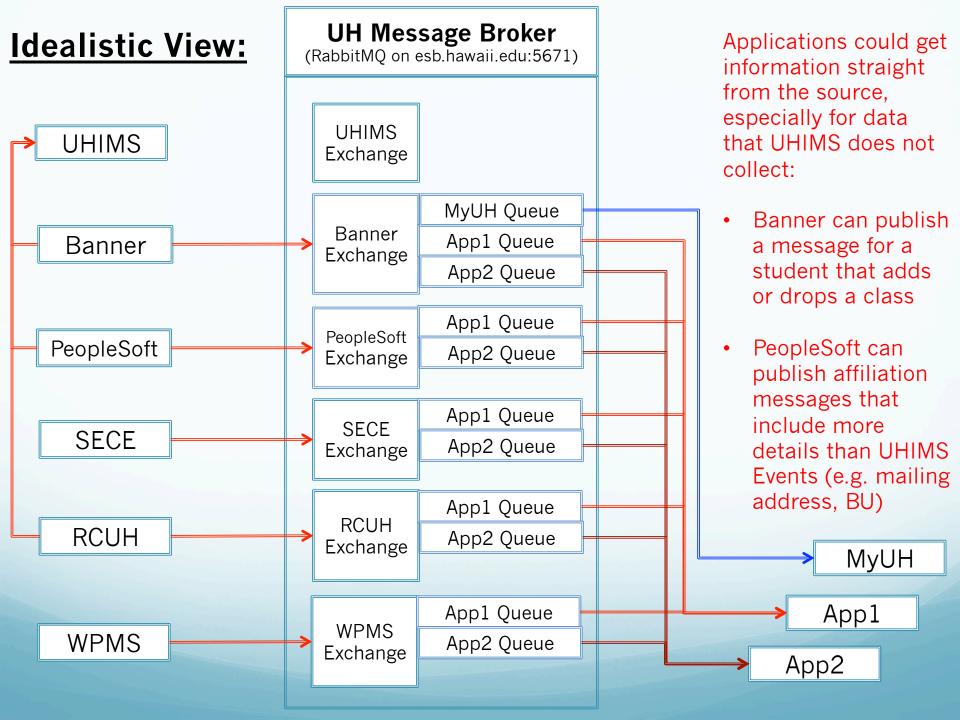
SECE Exchange

RCUH Exchange

WPMS Exchange UHIMS resolves identities coming from systems of record via a web service.

Systems of record get back the UH Number of the resolved identity. They should store the UH Number so they can publish messages about that person.





UHIMS Events

- Documentation posted on bwiki:
 https://www.hawaii.edu/bwiki/coming.soon>
- Suggestions and comments: its-iam-help@lists-hawaii.edu



CAS3, next generation Web Login Service

- Mobile: skinned for authentication on mobile devices
- Secure: all applications need to be registered with ITS
 - <https://testapp.hostname.hawaii.edu/path/to/testapp/>
 - Both test and production applications need to be registered
 - An online form for registration requests is planned
- Flexible: attribute release is policy driven, therefore flexible
 - About the default attribute release policy
 - Note that our LDAP implementation is based on the eduPerson object class
 - <http://www.educause.edu/eduperson/>
 - And our implementation notes are published in the IAM pages
 - <https://www.hawaii.edu/bwiki/x/EgBYDQ>
 - The above is useful in case you require attributes not included amongst the defaults

CAS3, next generation Web Login Service

To eventually replace CAS2, which you may recognize as

Web Login So	ervice ERSITY OF HAWAI'I			
You have requested access to a site that requires University of Hawai'i authentication.				
UH Username:	Quick Links			
UH Password:	What is the Web Login Service?			
Warn me before logging me in to other sites.	Forgot my password			
Login				
Copyright © 2008 Unauthorized access is prohibited by law in accordance with Chapter 708, Hawai'i Revised Statutes; all use is subject to University of Hawai'i Executive Policy E2.210.				

CAS3, next generation Web Login Service

Default attribute release policy (planned)

Attribute (LDAP)	Value (1)	Value (2)
cn	Jane Ernestine Doe	
displayName	Jane Doe	
eduPersonOrgDN	uhm	kcc
uhOrgAffiliation	eduPersonOrgDN=uhm, eduPersonAffiliation=staff	eduPersonOrgDN=kcc, eduPersonAffiliation=student
uhPersonAffiliation	staff	student
uhUuid (UH Number)	11668132	
Uid (UH Username)	jdoe	

CAS3, next generation Web Login Service, continued

- CAS3 Test environments ready for UH developers:
 - <https://cas-test.its.hawaii.edu/cas/>
 - <https://cas-test.its.hawaii.edu/cas/login>
 - <https://cas-test.its.hawaii.edu/cas/logout>
 - See http://www.jasig.org/cas/protocol for details.

CAS2, our current Web Login Service

- Ideally, to be phased out over 24 months (no start date yet)
- The CAS2 test environment was been relocated to:
 - https://cas2-test.its.hawaii.edu/cas/

Quick status reports for previously mentioned projects

- Update: ACER Acknowledgements and Certifications
- Update: Grouper Groups for LISTSERV enhanced lists
- Update: LDAP 2012 Project and the AD task
- Update: UH Message Broker

Update: ACER – Acknowledgements and Certifications

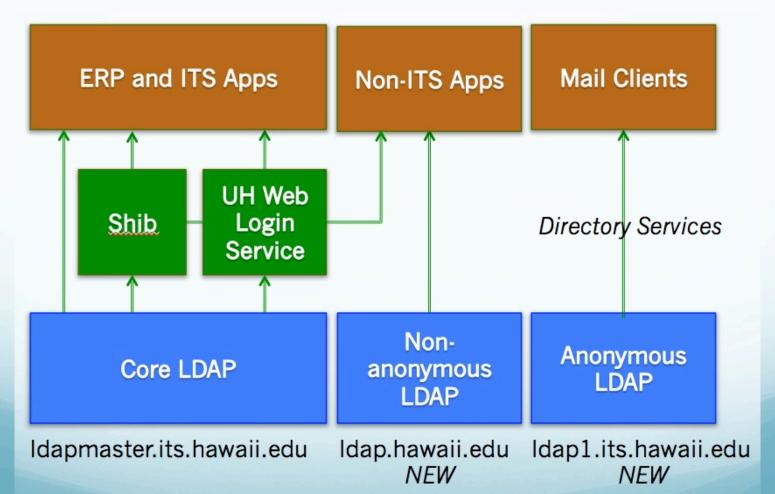
- Now in production
- ITS uses ACER/GCN for onboarding staff
- Hamilton library plans to use ACER/GCN for staff onboarding
- KFS and Banner planning to use ACER/GCN as part of the process of setting up access authorizations
- SECE enhancements planned for Sept/Oct 2012
- ACER 2.0 feature set in draft and presented for consideration as an ITS 2013 priority project

GCN = General Confidentiality Notice (UH Form 92)

Update: Grouper Groups for LISTSERV enhanced lists

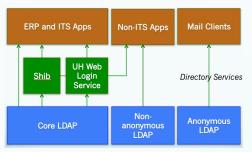
- Now in production and piloting with UH Hilo
- Grouper integration with LDAP authentication scheduled for Fall 2012
- Work on progress on a web-enabled front-end for the UH Community; they will be able opt out of select email discussion and announcement lists.

Update: LDAP 2012 Project and the AD task



Update: LDAP 2012 Project and the AD task

- Successfully completed
 - LDAP 389DS masters set up in "test"
 - LDAP 389DS to Active Directory sync'ing
- 2-month Delay, sys-admins gone to KFS
 - Anticipating mid August for reengaging on this project
- Work to be completed
 - Implement production environment
 - Continue to explore AD use-cases and solutions
 - HCC use-case Federating Identity Management
 - Containing costs AD is proprietary technology



Update: UH Message Broker

- Now in production
- Configured for message durability
- IAM team to develop online resources for UH **Applications Developers**
- Anyone interested in getting started or more information can contact its-iam-help@lists.hawaii.edu







Questions?



Special thanks to Monir Hodges for today's edibles!

IAM online resources

https://www.hawaii.edu/bwiki/display/UHIAM/UH+Applications+Developers">https://www.hawaii.edu/bwiki/display/UHIAM/UH+Applications+Developers>