Integration Services

UCSF Sharecase

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Felicisimo Bautista, Information Services Unit (ISU)

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Agenda

- Overview
- Types of Integration
- Tools and Services
- Current Projects
- FHIR, HiIP and OAuth2
- API example with APeX
- Questions
UCSF Integration Services

- Provides integration solutions across UCSF enterprise and beyond.

- Provides the integration platforms and expertise to build robust, reusable and cost efficient interfaces.
Bank and ATM’s Integration – Example 1
Travel Agency Integration – Example 2
Integration tools for UCSF Campus, Medical Center, Research and Business

- Integrates the catalog of applications
- Solves the problem of sharing and exchanging data
- Normalizes data
- Connects both modern and legacy applications
- Point of contact for integration
Examples of Data and Integration Types

- Patient
- Clinical
- Staff
- Financial
- Research
- Surveys
- Regulatory
- Student
- Location

- HL7
- Web Services
- API
- Flat Files
- X12
## By the Numbers

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Vendors</td>
<td>90</td>
</tr>
<tr>
<td>Number of Applications Connected</td>
<td>140</td>
</tr>
<tr>
<td>Number of Interfaces</td>
<td>290</td>
</tr>
<tr>
<td>Number of HL7 Transactions Daily</td>
<td>2,000,000 (approx)</td>
</tr>
<tr>
<td>Number of Transactions through Mulesoft (ESB/API) Daily</td>
<td>600,000 (approx)</td>
</tr>
<tr>
<td>Number of Files Transferred Daily</td>
<td>2,000</td>
</tr>
<tr>
<td>Support Hours</td>
<td>24 x 7 x 365</td>
</tr>
<tr>
<td>Number of Integration Services Staff</td>
<td>18</td>
</tr>
</tbody>
</table>
Patient Workflow
## What Else?

| **CareWeb** | Chatter like capability built around the patient Integration:  
• Patient and Treatment Team |
|-------------|------------------------------------------------------------------|
| **TransUnion Patient Cost Estimator** | Provide Patient liability estimate for planned procedures Integration:  
• Planned Procedure Codes, Patient Insurance and Physician |
| **CAIR California Immunization Registry** | Immunization reports to CA state. Part of Meaningful Use Integration:  
• Immunization |
| **Athena Breast Health Network** | UC wide collaboration for breast cancer patients with the goal of revolutionizing the course of their care Integration:  
• Radiology Results, Clinical Visits, Survey |
| **EDS to PeopleSoft** | Supports the de-provisioning of staff between EDS and Peoplesoft. Made the staff data available for re-use Integration:  
• Staff data set |
Our Service Overview

- **Tools**

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cloverleaf</td>
<td>HL7 messaging in healthcare integration solutions</td>
</tr>
<tr>
<td>MuleSoft</td>
<td>Enterprise Service Bus (ESB) and API Manager</td>
</tr>
<tr>
<td>Epic Bridges &amp; Data Courier</td>
<td>HL7 EDI Gateway to and from APeX – UCSF’s EHR</td>
</tr>
</tbody>
</table>

- **Services**

  - **PaaS** – Enterprise Service Bus (ESB) and API Manager as Platform as a Service
  
  - **Implementation and Consulting Services** - to build new integrations from scratch, enhance existing integrations, or provide consulting to help you achieve your integration needs
## Current Projects – In Flight

<table>
<thead>
<tr>
<th>Project</th>
<th>Type</th>
<th>Team</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epic Upgrade</td>
<td>• EHR Upgrade to 2015 version • New server at Quincy</td>
<td>Damon and Vern – Lead Integration Team</td>
<td>XXL</td>
</tr>
<tr>
<td>Image viewer replacement</td>
<td>• Needs to be done prior to Epic upgrade • Replace iSite with eUnity</td>
<td>Rajesh</td>
<td>Small</td>
</tr>
<tr>
<td>3M</td>
<td>• Computer Assisted Coding (CAC) • 10 new interfaces from multiple data sources</td>
<td>Vern – Lead Maria, Ajish and Senthil</td>
<td>Large</td>
</tr>
<tr>
<td>School of Dentistry</td>
<td>• Integration with Axium – SOD EHR</td>
<td>Dave</td>
<td>Small</td>
</tr>
<tr>
<td>Archibus</td>
<td>• Space management application • Integration with EDS • Expose building metadata from Archibus as API</td>
<td>Brian, Julia, Swarnim and Veera</td>
<td>Med</td>
</tr>
<tr>
<td>PACE/UDAR – Phase 1</td>
<td>• New integration for Alumni Relations • EDS and SIS to UDAR Salesforce Org • Assisting UDAR staff learn Mule</td>
<td>Brian, Julia, Swarnim and Veera</td>
<td>Med</td>
</tr>
<tr>
<td>Meaningful Use Result Reporting (MURR)</td>
<td>• Integration of specific lab results to CA</td>
<td>Matthew</td>
<td>Small</td>
</tr>
</tbody>
</table>
# Current Projects – In Flight

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<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EMERGE</strong></td>
<td>• Application to predict patient harm</td>
<td>Ajish</td>
<td>Large</td>
</tr>
<tr>
<td></td>
<td>• Harm algorithm based on patient results and device monitoring readings</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SuperAlarm</strong></td>
<td>• Patient and Lab Integration with SuperAlarm</td>
<td>Maria</td>
<td>Small</td>
</tr>
<tr>
<td><strong>John Muir</strong></td>
<td>• Referral and Results integration with John Muir</td>
<td>Rajesh and Josh</td>
<td>Med</td>
</tr>
<tr>
<td></td>
<td>• Phase 1 of Bayhealth</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Breast Milk Tracking</strong></td>
<td>• Improve patient safety for breast milk tracking</td>
<td>Belinda and Matthew</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td>• Vendor - Timeless</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Student Information System</strong></td>
<td>• Expose SIS API’s</td>
<td>Brian, Julia, Swarnim and Veera</td>
<td>Med</td>
</tr>
<tr>
<td><strong>MuleSoft Upgrade</strong></td>
<td>• Upgrade ESB tool</td>
<td>Julia, Swarnim and Veera</td>
<td>Med</td>
</tr>
<tr>
<td><strong>Specialty Lab</strong></td>
<td>• Integration with Transplant specialty lab - Histotrac</td>
<td>Rajesh</td>
<td>Med</td>
</tr>
<tr>
<td></td>
<td>• Complex workflow</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IDEAS – Fertility Clinic</strong></td>
<td>• Case scheduling interface with Fertility Clinic</td>
<td>Rajesh</td>
<td>Small</td>
</tr>
</tbody>
</table>
Integration Projects are Shared Responsibility

IT
Network, Server, Security, QA, PM

System owners and SMEs

Source system developers

Consumer system developers

ITS Integration Services Team
HL7 Versions

- 2.1 released in 1990
- 2.3 (1997)
- 2.3.1 (1999)
- 2.8.2 (current)

Approximate real-world usage of HL7 messaging standards
FHIR: The Emerging Interoperability Standard

- Release in 2017
- In draft status for trial use
- Simpler objects, resource-based
- Human readable (json, XML)
- Interoperable by design
- Standard API architecture (REST)
- v2 -> FHIR, not FHIR -> v2
- Profiles
- Server Roles: Data, Terminology, Patient, Registry
FHIR – Industry Momentum

- SMART on FHIR - http://smarthealthit.org
- Vendors
  - Epic
  - Cerner
  - athenahealth
  - McKesson
  - MEDITECH
HiiP Architecture

![Diagram of HiiP Architecture]

**Example of Authorization for Demographic data:**

<table>
<thead>
<tr>
<th>Privilege Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Yes/No</td>
</tr>
<tr>
<td>- Contact Info</td>
</tr>
<tr>
<td>- SSN, MRN</td>
</tr>
<tr>
<td>- <em>All</em></td>
</tr>
</tbody>
</table>

- 0: Not Authorized
- 3: Read
- 7: Update
- 9: Full Access
OAuth2 Requirements

- Box API Reference Implementation: https://developers.box.com/oauth/
- Client_Id & Client_Secret (systems)
- “The Dance”
  - Authorize: patient logs into app and authorizes APeX
  - Token: callback to HiiP to retrieve patient’s token (app)
  - Revoke: cancel patient relationship between systems
  - Refresh: refresh expiration datetime for token
APeX Integration w/Partners (OAuth2)
DeepLinked Blip App within APeX
API Architecture and Demo
Through its singular focus on health, UCSF is leading revolutions in health.

Visit our booth!

find us @ integrationservices.ucsf.edu