Building the Future of Fedora

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The Problem

- A large, aging codebase +
- Declining year-on-year number of developers +
- Declining year-on-year number of commits +

= slow to develop new features, hard to attract new developers

A strong and engaged developer community is an essential part of a preservation repository’s success and sustainability
Fedora 3 Commits Over Time
Building Lean

Build - Measure - Learn

- Regular, short deliverables, validated with customers
  - A feature is delivered when it's made user-visible
  - A change in the development culture: customer-driven, data-driven
- Continuous integration, code quality, metrics gathering
- Profiling, benchmarking test suite
Fedora 4: Use Cases

Identified over 30 initial use cases

Large overlap, four major topics

1. manage research data

2. improve administrability

3. handle heterogeneous data more efficiently

4. interact with linked open data/semantic web

See: https://wiki.duraspace.org/display/FF/Use+Cases
Building Lean, cont’d

• Q: Reuse or Rewrite?

• A: Reuse and Rewrite

  • Just 1 week to implement the minimum feature set to support running Hydra and Islandora on top of Fedora 4

<table>
<thead>
<tr>
<th>Validation</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hydra (rubydora, sufia fork)</td>
<td>• REST APIs</td>
</tr>
<tr>
<td>• Islandora (tuque)</td>
<td></td>
</tr>
<tr>
<td>• SCAPE</td>
<td>• Clustering for performance</td>
</tr>
<tr>
<td>o billions of Google Books scans</td>
<td>o Projection over HDFS</td>
</tr>
<tr>
<td>o &gt; 90TB</td>
<td>o Deployment</td>
</tr>
</tbody>
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# Fedora 4: Features

| Durability                  | • Self-healing  
|                            | • Transactions  
|                            | • Clustering for high availability  
|                            | • Metrics and reporting  
| Performance                | • Batch operations  
|                            | • Clustering for scalability  
|                            | • Projection, aka "instant ingest"  
| Flexibility                | • HATEOAS support  
|                            | • Eventing, messaging, & web hooks  
|                            | • Policy-driven storage  
|                            | • More storage options  
|                            | • Easy install & deployment  
|                            | • CMIS*  
|                            | • WebDAV*  
|                            | • OAuth 2*  

* experimental
# Fedora by the Numbers

<table>
<thead>
<tr>
<th></th>
<th>Fedora 3.6.2</th>
<th>Fedora 4 (alpha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lines of code</td>
<td>128,381</td>
<td>8,641</td>
</tr>
<tr>
<td>Test coverage</td>
<td>10.2%</td>
<td>71.8%</td>
</tr>
<tr>
<td>Public, documented API</td>
<td>44.4%</td>
<td>99.8%</td>
</tr>
<tr>
<td>Commits (12 months)</td>
<td>73</td>
<td>970</td>
</tr>
<tr>
<td>Contributors (12 months)</td>
<td>6</td>
<td>14</td>
</tr>
</tbody>
</table>

Sources:
- [http://sonar.fcrepo.org/](http://sonar.fcrepo.org/)
- [https://www.ohloh.net/p/fcrepo/](https://www.ohloh.net/p/fcrepo/)
- [https://www.ohloh.net/p/fcrepo4/](https://www.ohloh.net/p/fcrepo4/)
Architecture
Who Should be Using Alpha 1?

Early adopters

- Institutions with specific pain points with Fedora 3, e.g.
  - performance, scalability, storage flexibility, storage cost, high availability
- Institutions new to Fedora
- Institutions building out new (greenfield) Fedora applications, e.g.
  - research data management
  - multimedia/video
Solid Foundation In-Place

• Software infrastructure has been established
  ○ Code base
  ○ Agile process
  ○ Continuous integration environment

• Governance infrastructure has been established
  ○ Steering committee
  ○ Advisory working groups (technical and other)
  ○ Development team
1. Minimize base feature set
   - Core features (examples)
     - Stable API
     - Versioning
     - Authentication / Authorization
     - Hardening Alpha capabilities
     - ...
   - External features (examples)
     - Fedora 3 --> Fedora 4 migration
     - Search
     - Triplestore
     - ...

2. Stakeholder validation of feature sprints

3. Aggressive release schedule
Be a Part of the Solution

- Provide sponsorship funding
- Provide skilled developers
- Provide use cases
- Spread the word
Thanks to our great devs!

- Chris Beer, Stanford University
- Ben Armintor, Columbia University
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- Vincent Nguyen, Centers for Disease Control
- Greg Jansen, UNC Chapel Hill