Cloud First Application Development

Lunchtime Learning

December 8, 2016

ISC's Cloud First Program

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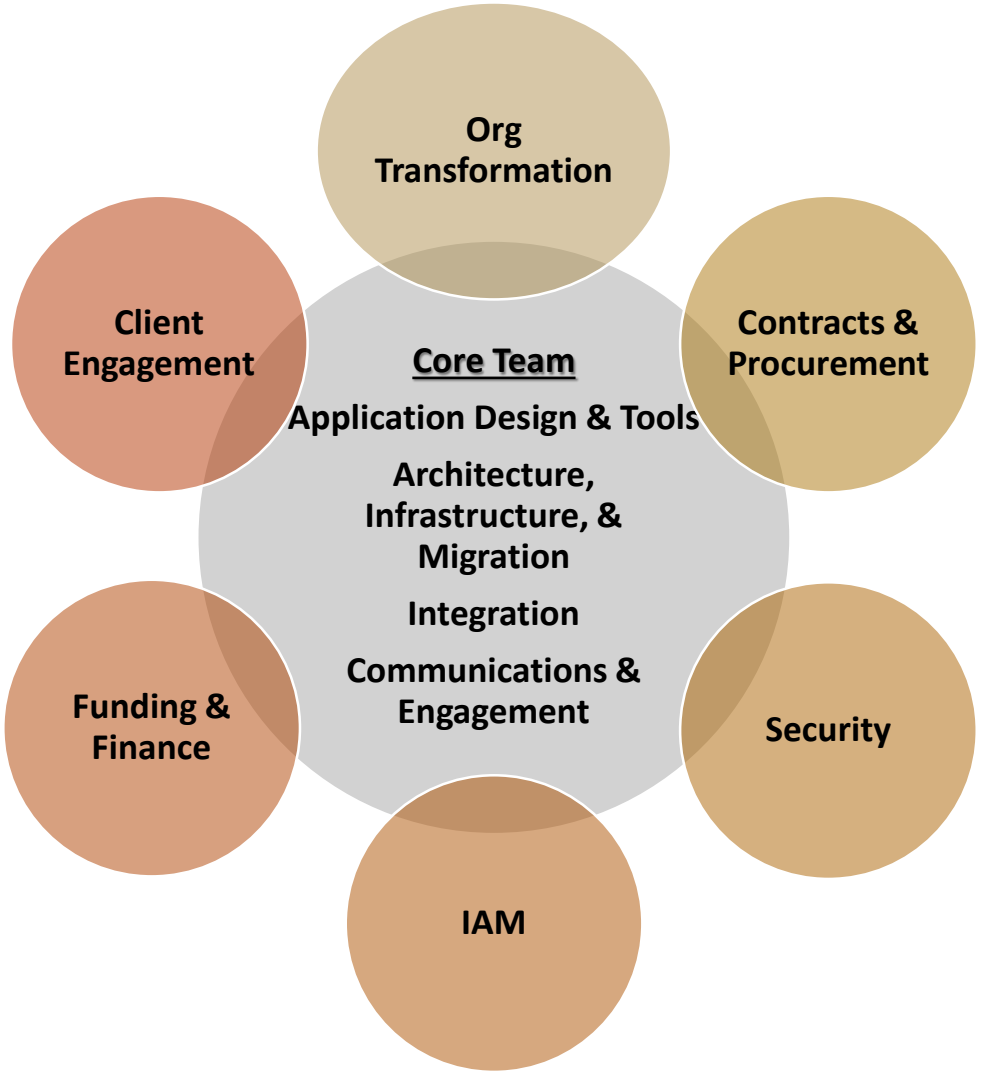


Integration: What (review)

- Two primary flavors
  - Authentication and authorization
    - PennKey/SAML
    - PennGroups
    - Penn Community
  - Application-specific data
    - Data into applications (think student enrollment data into Canvas, or employee job data into KnowledgeLink)
    - Data out of applications, to other applications or to reporting and analytics environments like the Data Warehouse

Integration: Current State

- Primarily point-to-point integration between SaaS, hosted, on-prem solutions and/or data warehouse
- Variety of technical approaches
  - PL/SQL / Oracle tool approaches
  - Java / FAST / other development environments
  - Mule / ESB
  - Penn Community APIs
- In most cases, dependent on highly-skilled developers

Integration: Goals

- Tool**set** that will accommodate
  - Use by business analysts / non-programmers
  - Support Warehouse needs
  - Support SaaS implementations with support for data to/from on-prem sources
  - Support Penn-developed applications
  - Support intra-application integrations (B2B / SaaS-to-SaaS)
- Processes and documentation on standard usage for the tools we acquire
- Integration Service supporting needs across ISC and the University's schools and centers

Integration: work to date

- Lessons learned (nothing surprising)
  - Most vendors of SaaS solutions we use don't have great API/web service platforms
- RFI/RFP content for Penn-wide consumption
- ETL tool acquisition effort in progress
  - Currently working on live proof-of-concept use cases with two vendors
  - Both vendor solutions meet multiple needs which may provide integration solution(s) for cloud-based services
- Research into other integration directions
  - iPaaS, mPaaS, xXaas . . .
  - This is a rapidly evolving product space; evaluation pending available expertise/resources

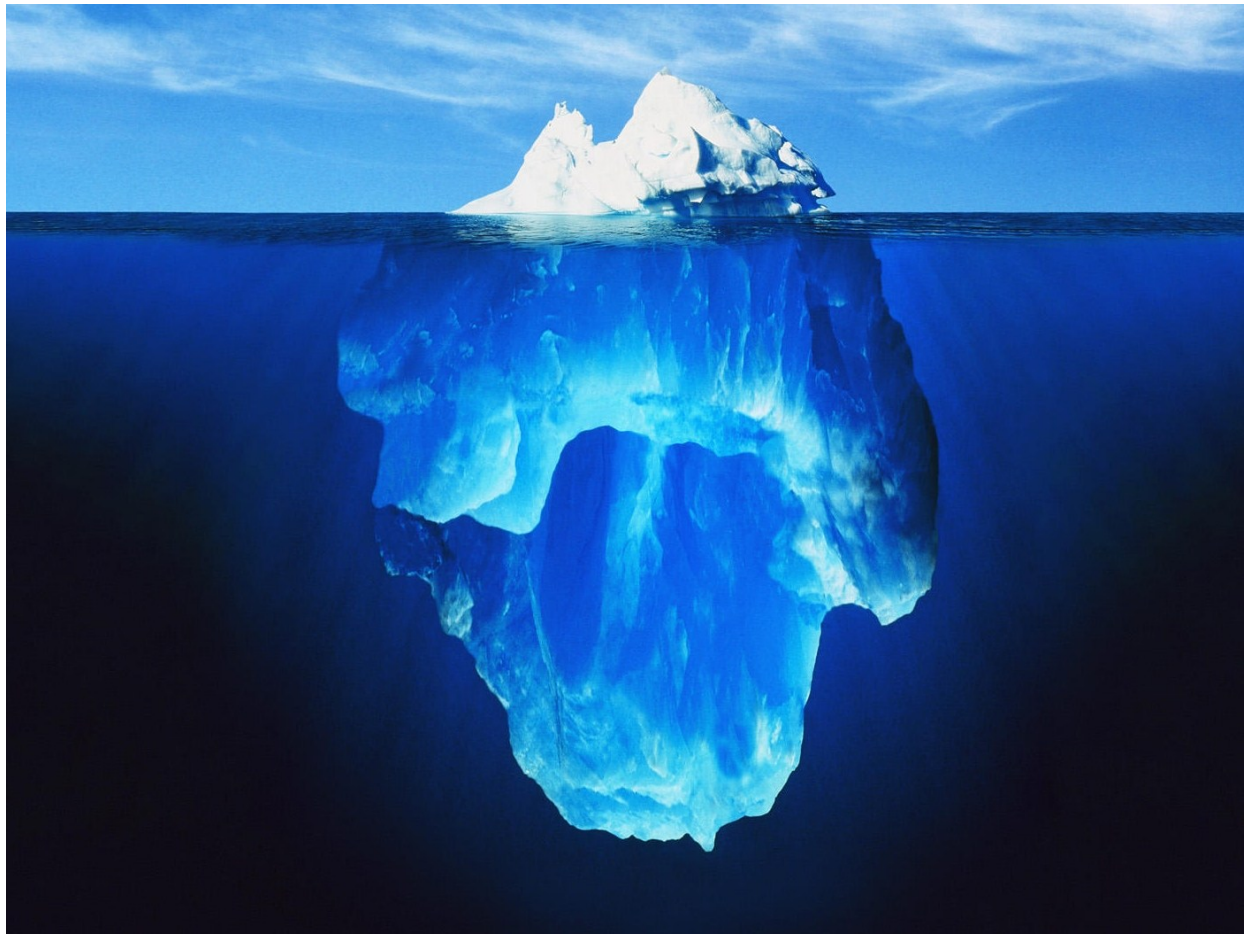
Today

- Why change so much?
- What's our project?
- Updates and demos
  - Technology Stack: Matt Schleindl
  - Behavior and Test Driven Development: Sam Donnelly
  - Agile Development: Lisa McBriar

What goes into an app

- ✓ A user interface
  What people see

But there's a lot more lurking…



…Technical Debt

What goes into an app

- ✓ Business logic
  Actual value

What goes into an app

- ✓ AuthN and AuthZ
- Security

What goes into an app

- ✓ Persistence and data stores
  Making it all matter

What goes into an app

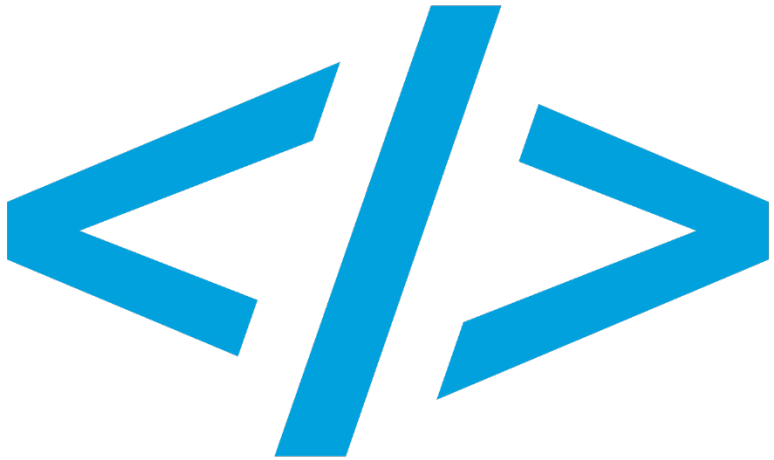
- ✓ Integration points
  Playing well with others

What goes into an app

- ✓ Testing
  Proof it's doing what it should be

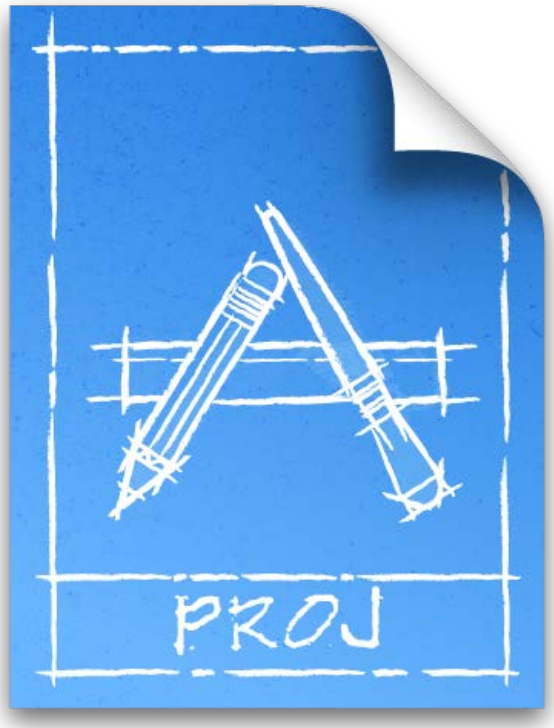
What goes into an app

- ✓ A source repository
  Storage for code and config



What goes into an app

- ✓ Deployment pipeline
  Getting built and available



What goes into an app

- ✓ A platform
  Somewhere to run and scale

That's a lot of stuff

- ✓ User interface
- ✓ Business logic
- ✓ Authentication and security
- ✓ Persistence and data stores
- ✓ Integration points
- ✓ Testing
- ✓ Source repository
- ✓ Deployment pipeline
- ✓ Platform

Until now…

- We've built these ourselves
  - And VERY successfully so!
  - Like many, many others
  - With full control
  - Minimal short-term risk
  - One language
  - Unique ISC terminology

- As 3-tier monolithic apps

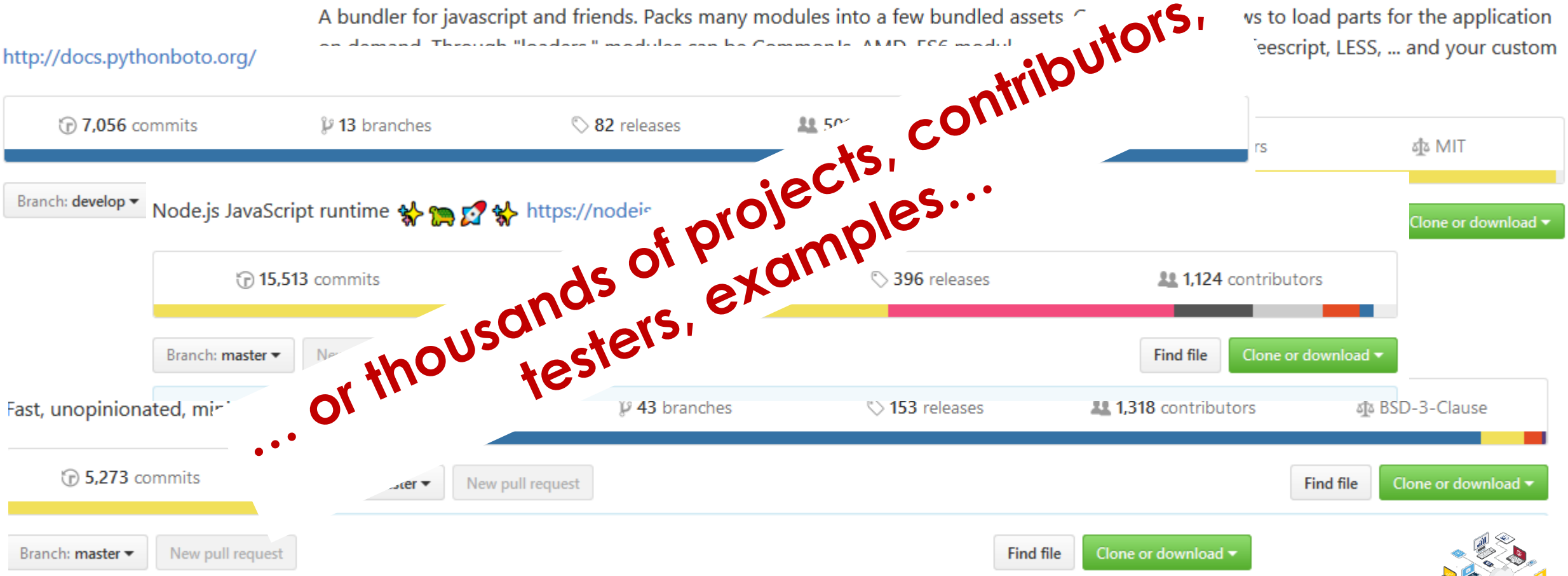
FAST framework and LCF

And for each one of those pieces...

We have to:

- ❑ Provide help, support, and examples
- ❑ Train and gain mindshare
- ❑ Build components and modules
- ❑ Maintain security
- ❑ Incorporate new technologies
- ❑ Innovate and revamp
- ❑ React to industry changes
- ❑ Test and roll out

We can't keep up

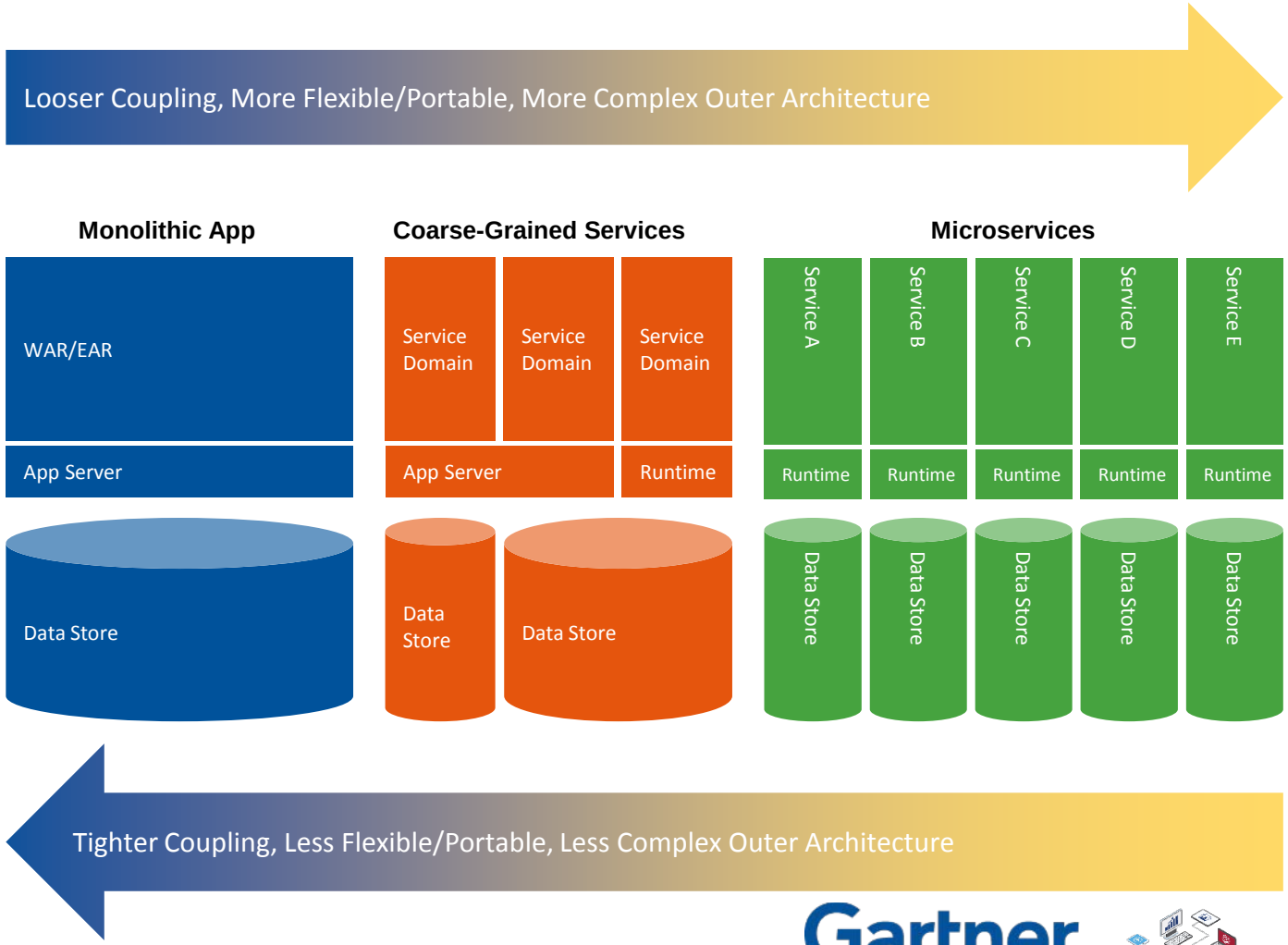


… or thousands of projects, contributors, testers, examples…

>

Modern applications are…

- No longer self-contained
- Think service areas
  - Finance
  - Student systems
  - HR
  - Research
- Composed of small pieces
  - Reusable
  - Built that way
  - Deployed that way



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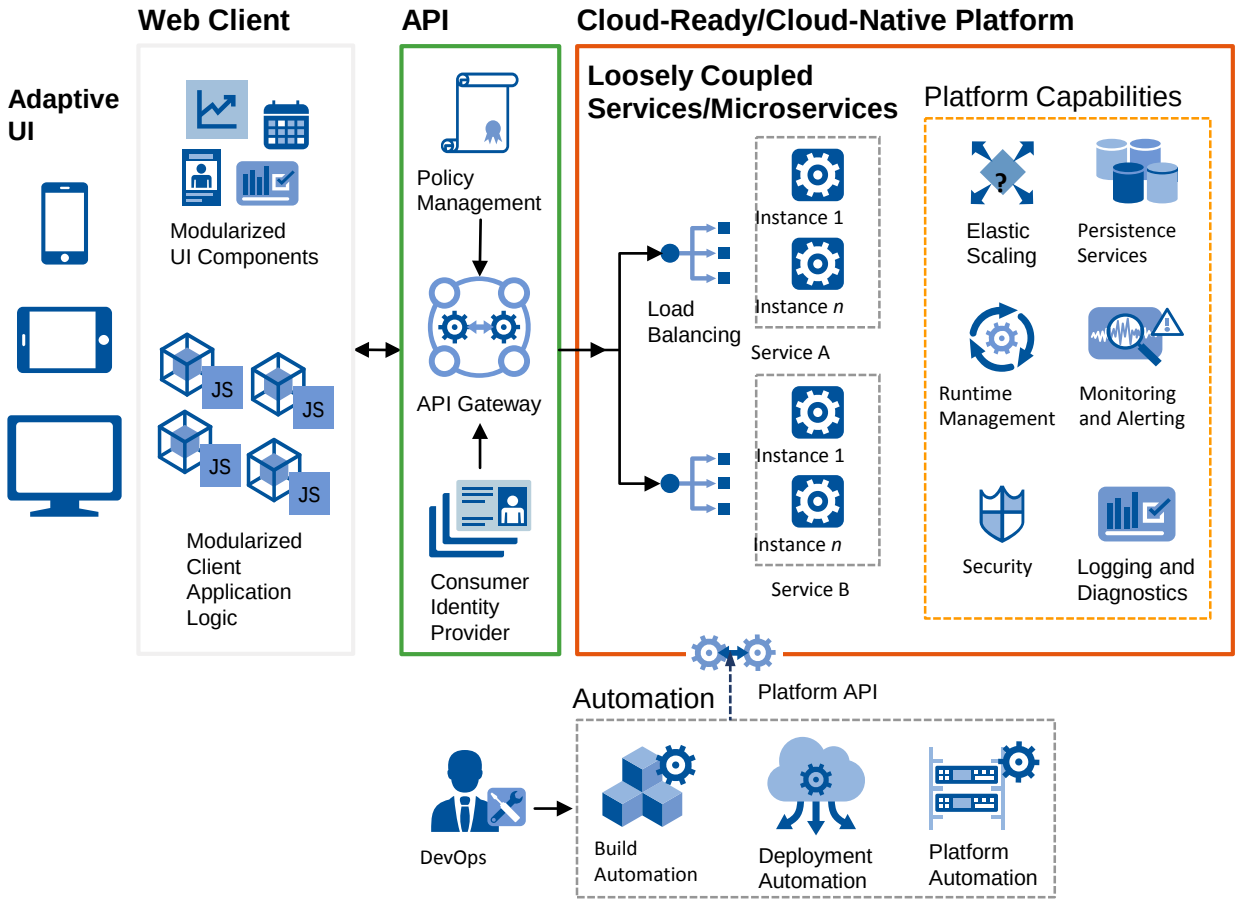
And each one is...

- Broken down even more
- An assembly of others' work
  - Open source
  - Vendor products
  - PaaS, SaaS, modules
- Small, disposable pieces



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The result is a conscious choice

- Someone else built it
  - And VERY successfully so!
  - Like many, many others
  - Less control
  - More short-term risk
  - More languages
  - Common terminology
  - More time spent on the parts people see, not frameworks!!!

Working this way also means...

- New processes
  - Agile development
  - Automated testing
  - Service-oriented delivery model
  - Microservices
  - DevOps
  - Architecture lifecycle management
  - Open source engagement

So what is this project?

First of all… who:

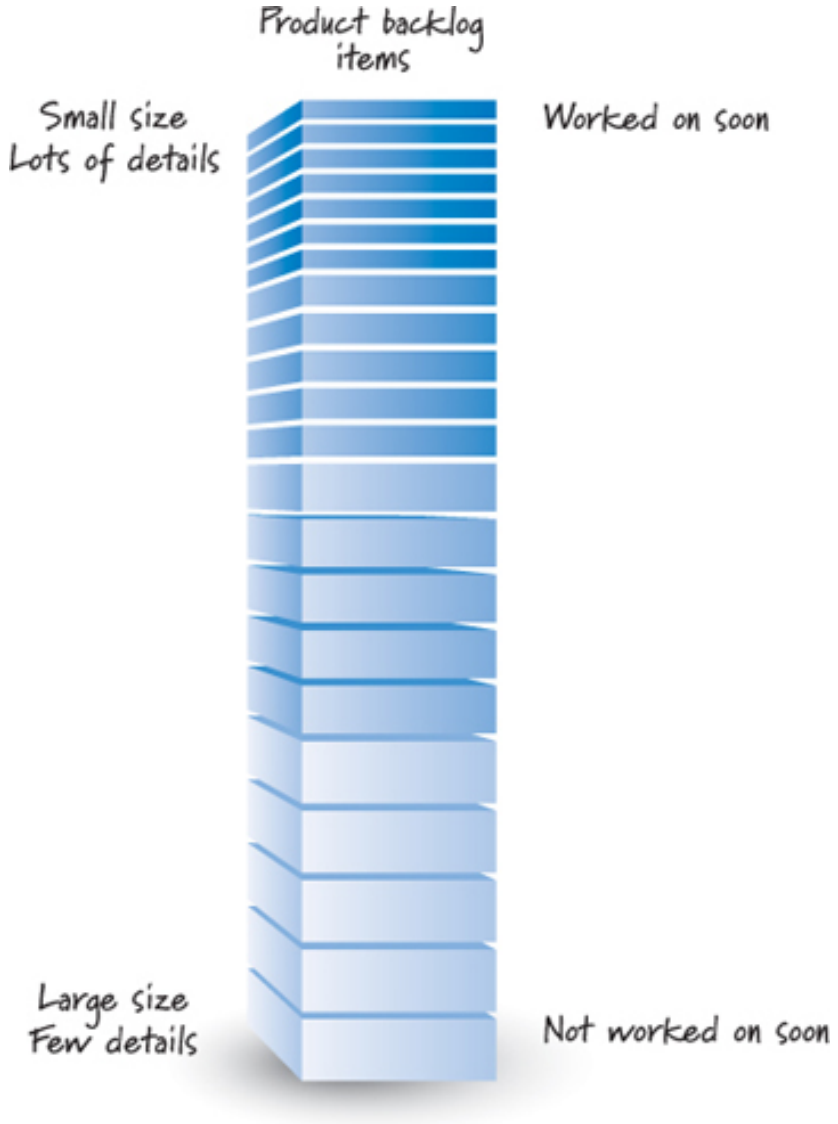
- Tim Bouffard, Application Architect
- Sam Donnelly, Sr. Application Developer
- Bryan Hopkins, Sr. IT Project Leader
- Anome Mammes, Sr. Application Developer
- Lisa McBriar, Sr. Business Systems Analyst
- Matt Schleindl, Application Architect

So… what is this project?

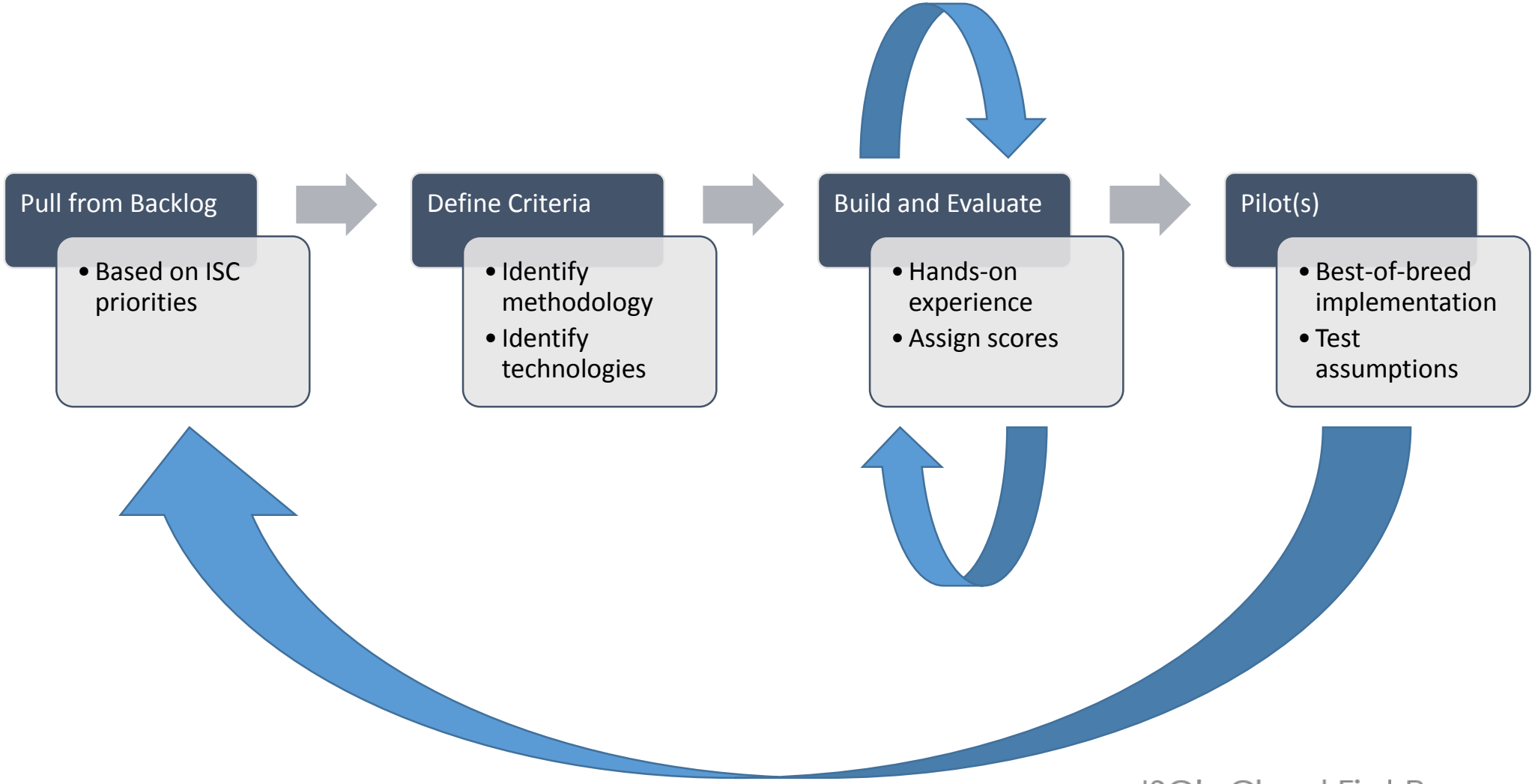
- ❑ Agile development
- ❑ Automated testing
- ❑ Service-oriented architecture
- ❑ Microservices
- ❑ DevOps
- ❑ Architecture lifecycle management
- ❑ Open source engagement

- ❑ User interface
- ❑ Business logic
- ❑ Authentication and security
- ❑ Persistence
- ❑ API platform
- ❑ Testing
- ❑ Source repository
- ❑ Deployment pipeline
- ❑ Platform and scaling

So… what is this project?



Work iteratively

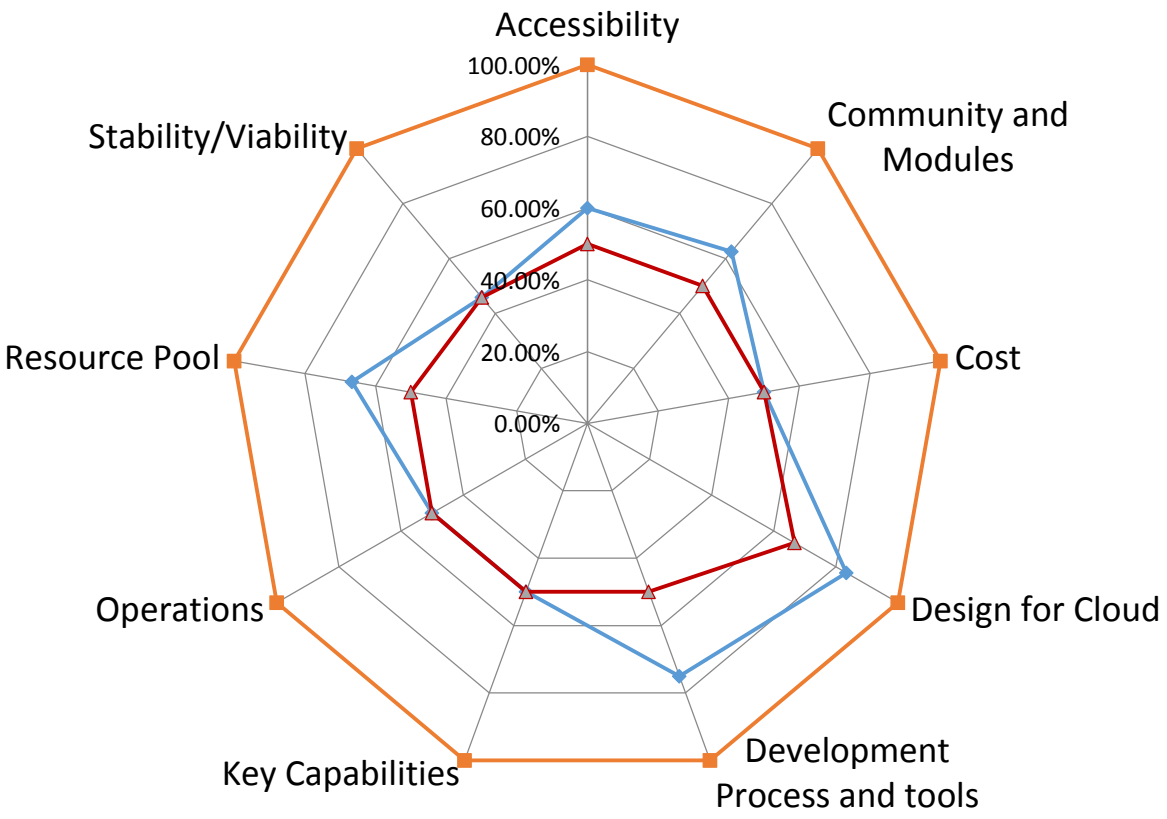


Yeah but where are we now?

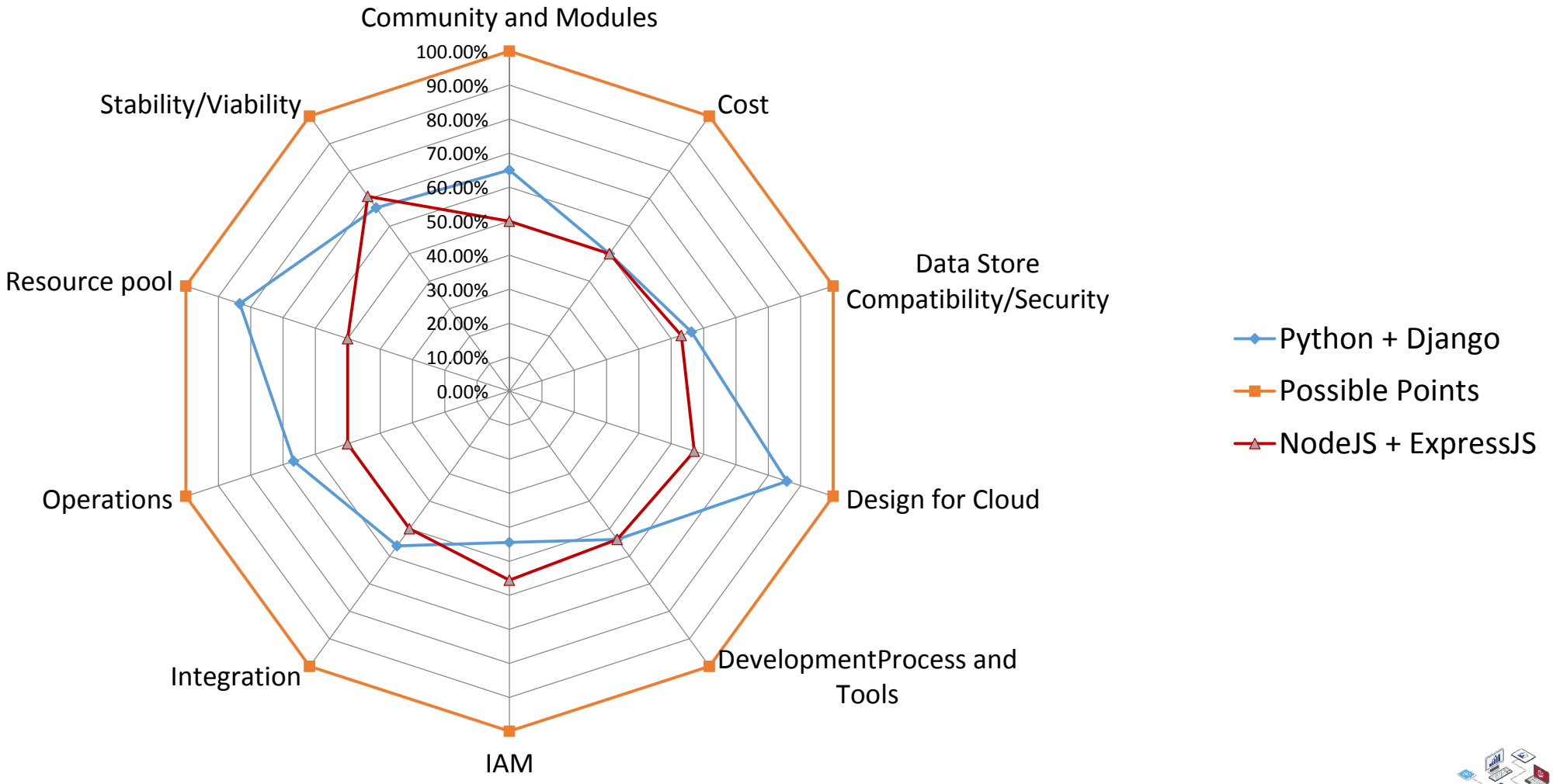
Yeah but where are we now?

https://www.isc.upenn.edu/cloud-first-application-delivery-refresh

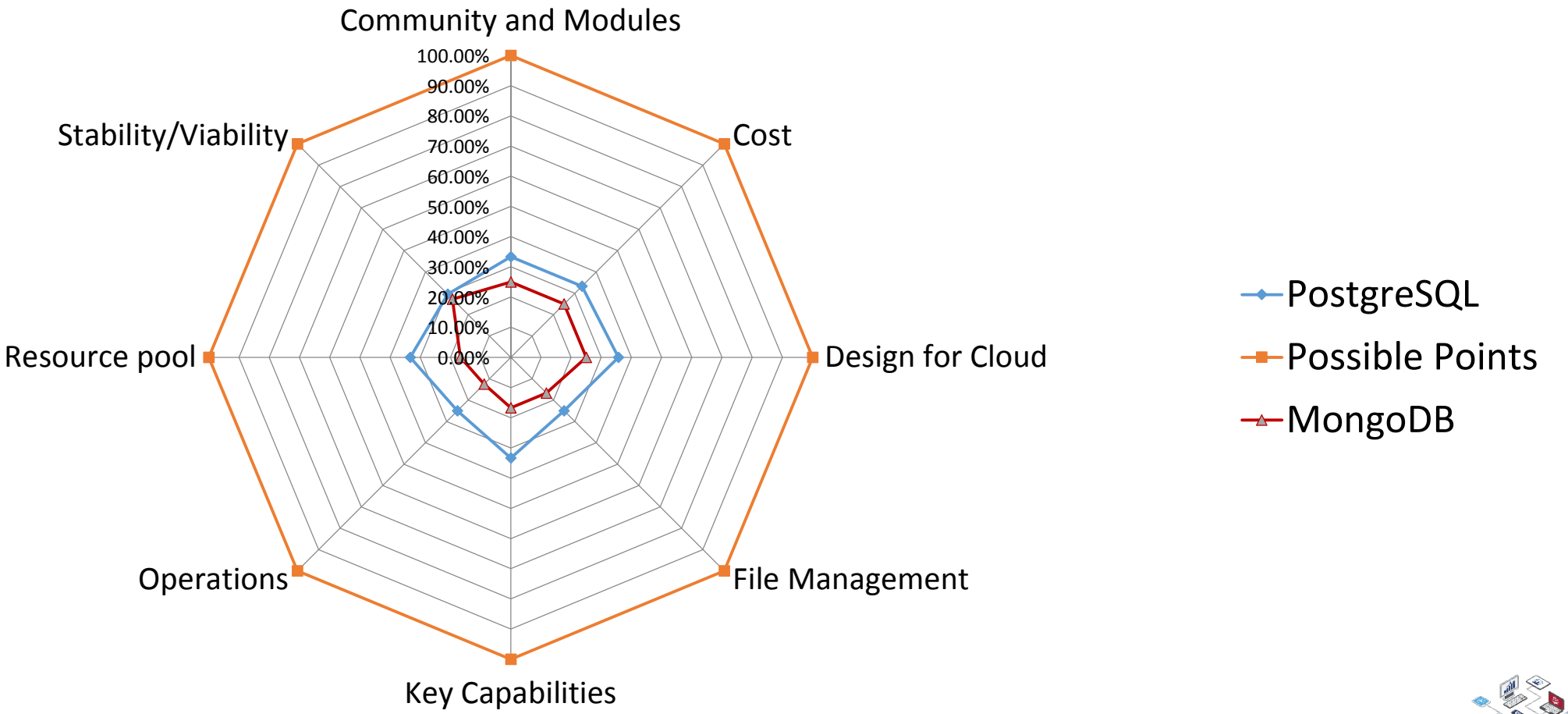
Results – UI Framework



Results – Server Framework



Results – Local Data Store



Details! Decisions...

- ✓ User interface: **AngularJS + Bootstrap + Webpack**
- ✓ Business logic: **Django REST Framework + Zappa**
- ✓ AuthN and security: **NodeJS + ExpressJS + Passport-SAML**
- ✓ Persistence: **PostgreSQL**

Details! Placeholders...

- API platform: **AWS API Gateway**
- Backend testing: **Django TestCase + Mocha + Chai**
- UI testing: **Selenium + Karma + Gherkin**
- Source repository: **Gitlab**
- Deployment pipeline: **Jenkins**
- Testing automation: **Jenkins**
- Platform and scaling: **AWS ECS + AWS Lambda**
- Agile development: **JIRA Agile Plugin + Kanban**

Not even started…

- Service-oriented architecture
- Microservices
- DevOps
- Architecture lifecycle management
- Open source engagement
- More…

No more slides. Demos!

Technology Stack: Matt Schleindl
Behavior and Test Driven Development: Sam Donnelly
Agile Development: Lisa McBriar

Comments/Questions

- Questions?
- Website: https://www.isc.upenn.edu/cloud-first
- Comments and suggestions for future topics can be sent to:
  cloud-first@isc.upenn.edu