CLOUD FIRST PROJECT PLANNING

Application Design (Tools, Frameworks, Processes)

Lead Name: Bryan Hopkins

Scope

Lay the necessary foundation for ISC to efficiently deliver and support modern application services in the cloud. Alignment across ISC functional areas and leveraging industry and peer technologies, processes, and modules is key to empowering developers to focus on high value work.

Within Project

- Deliver applications with a cloud-first mindset, using application development frameworks, technology stacks, programming languages, tools, and design patterns
    - Define the types of development work that are conducive to a cloud-first ISC, and identify the technologies, processes, and tools best suited to that work. This includes being more purposeful in our approach to being good integrators, service providers, and enablers of application development across Penn.
- Automation and continuous integration
    - Bring our successes with build automation to cloud platforms, and expand them to include deployment, auto-scaling and automated testing.
- Agile development processes, tools, and recommendations
    - Find lightweight changes to the way to we develop and support applications to speed up how quickly content and value can be delivered to clients and constituents.

Outside of Project

- Important but not foundational
    - Requirements gathering and prototyping tools and processes
    - Tools and processes for performance testing cloud applications
    - Revisions to the change management process to account for cloud and cloud-to-cloud considerations
- Touch points that are primarily in scope for other teams
    - Timeline and migration prioritization per application (Migration)

CLOUD FIRST PROJECT PLANNING

Penn Information Systems & Computing

Deliverables

1. Application development frameworks, technology stacks, programming languages, tools, and design patterns

- Application categorization scheme aligned with ISC's future application delivery goals*
    - Redefine development activities to be microservice-based, favoring smaller, composed islands of capability over monolithic applications
- Restructure decision making and API capabilities and governance around data domains rather instead of specific applications. (May iterate as pilots on a per domain basis)
- Evaluate and implement a cloud-based API Gateway for governance, documentation, analytics, and delivery of API services to the community
- Initial toolbox / iteration strategy for each category of application
    - Includes designing the UI (where appropriate), service, and data layers of the technology stack for cloud and rapid development
    - Accessibility, responsiveness, and capability are key UI criteria
    - PennKey authentication with shibboleth
    - Self-service provisioning for API access using industry common practices
    - Design for security, accessibility, and maintenance from the ground up
- Initial process recommendations for each category of application
- Gap analysis and iteration plan for the application delivery in a cloud first model
- Strategy for sharing and using shared libraries and code with the community (Penn, OSS) *
- End user documentation standards in support of client use of ISC services*
- Technical documentation standards in support of self-service, low friction development, and module reuse. *
- Service definition and launch for a cloud application delivery service
- Initial model for support and troubleshooting of cloud applications

2. Automation and continuous deployment/integration

- Initial toolbox / iteration strategy for building and deploying and progressing applications in each identified category
- Initial toolbox / iteration strategy for testing applications in each identified category
- Durable source code and deployment artifact versioning and storage strategy*
- Secure, repeatable, auditable strategy for managing application passwords and keys

3. Agile development processes, tools, and recommendations

- Recommendations on types developer-centric agile and collaboration tools*
- Recommendations on Test Driven or Behavior Driven development
- Functional and User acceptance testing strategies
- Formal definition and training of agile development SDLC for ISC

CLOUD FIRST PROJECT PLANNING

- Formal definition and training of agile development for clients
- Establishing alignment between agile SDLC, automated testing and deployment tools, and the business domain driven API service model.

4. Meaningful production application as a pilot
   - Gather realistic lessons learned beyond initial evaluation findings
   - Establish and iterate the service with additional production pilots

Quick wins highlighted with *

Resources

Role/Skill	Estimated Person Months
Application Architect (Project)	Very High
Service Ownership / Management (Project)	High
Senior Business Systems Analyst (Project)	High
Senior Application Developer (Project)	Medium
Senior Systems Architect (Project)	Medium
Senior Systems Administrator (Project)	Medium
Functional Area Service Ownership/Management (Project - pilot)	Medium
Shared Services / PMO (Project)	Medium
IAM Architect (Project)	Low
Senior Database Administrator (Project)	Low
Senior IT Security Analyst (Project)	Low
Application Architect (Ongoing)	Medium
Service Ownership / Management (Ongoing)	High
Senior Application Developer (Ongoing)	High
Senior Systems Architect (Ongoing)	Low
Senior Systems Administrator (Ongoing)	Low
IAM Architect (Ongoing)	Low
Senior Database Administrator (Ongoing)	Low
Senior IT Security Analyst (Ongoing)	Low

Other Resources

1. Cloud PoC PaaS and IaaS licensing and usage for evaluation
2. Developer tools (IDEs, Prototyping, collaboration, CI/CD, etc)
3. Developer training and expert consultation
4. Contractors for flexible development/support capacity

CLOUD FIRST PROJECT PLANNING

Issues, Challenges & Dependencies

- PACT touch points
- Application Rationalization touch points
- NGSS alignment
- ISC Cloud platform(s) alignment

Consulted individuals (beyond the cloud team):

- Tim Bouffard - John Breen - Ernie Chieffo - Bruce DeBonis - Justin Ettore - Dane Fetterman - Philip Halcomb - Shea Hammond - Tiffany Hanulec - Charles Harvey - Peter Heinemann - Chris Hyzer - Jim Johnson - Jeannine Kleba	- Anome Mammes - Lisa McBriar - Rosey Nissley - John O'Brien - Staccee Ramey - Melina Schweizer - Matt Schleindl - Muthu Thiagarajan - Lisa Waring - Anome Mammes - Lisa McBriar - Mike Morris - John Mulhern III - Isobel Thompson - Michel van der List

CLOUD FIRST PROJECT PLANNING

Communication and Engagement

Lead Name: Sarah Spaulding

Scope

Within Project

- Manage Cloud First Program Communication
    - Manage communication for Cloud First to keep ISC staff and clients informed about the program.
- Develop Cloud First Communication Resources/Documentation
    - Develop Cloud First project communication templates, program website, documentation and reference materials for ISC staff and clients.
- Staff Engagement
    - Engage ISC staff regularly to discuss the Cloud First initiative and develop opportunities to keep staff informed and involved.
- Client Engagement and Marketing
    - Engage clients regularly to discuss the Cloud First initiative, market the effort, articulate the value and provide opportunities for clients to help shape the direction of services.

Outside of Project

- Important but not foundational
    - Vendor training
    - Service specific documentation
    - Service specific communication to clients as services are moved to the cloud. (Service owners should coordinate with Client Care).
- Touch points that are in scope for the entire project
    - Research what other Universities/Ivys are doing – Is this a task for the entire Cloud First program since many other project groups have similar thoughts?

CLOUD FIRST PROJECT PLANNING

Deliverables

1. Manage Cloud First Program Communication

- Develop a communication plan to keep people informed *
    - Including Executive Summary, ITR presentation, Emma project launch email
- Compile audience specific updates from Cloud First project teams to be communicated to clients and ISC staff.
- Identify appropriate communication channels to keep clients and ISC informed and engaged. (IE: Cloud First SIG, Emma) *

2. Develop Cloud First Communication Resources and Documentation

- Develop common message for clients and ISC staff*
    - What does cloud mean?
    - Cloud First vision and goals
    - What is in it for them?
    - What do we (ISC) say to clients during this process?
- Create and manage Cloud First Program website
- Create a client area and an ISC staff area of the website
- Create a webpage to document program roadmap and successes and include:
    - Current state of services (what is in the cloud and what isn't?)
    - Document successes and lessons learned
    - Document the status of the program and various projects along the way
- Create service communication templates for Cloud First project managers and ISC service owners/managers.
- Develop and manage Cloud First presentations to be shared with clients and ISC staff.
- Coordinate documentation/checklists from Cloud First project teams to be provided to ISC service owners as a reference for moving services to the cloud.

3. ISC Staff Engagement

- Host information sessions for project groups to provide status updates to ISC staff and gather their feedback, answer questions and address concerns.
- Gather feedback regularly from ISC staff through various channels such as surveys.
- Host informal get togethers such as Lunch and Learns for ISC staff to share thoughts/resources/lessons regarding what they have learned during this effort.

- Provide regular updates about the Cloud First project through various channels including the ISC staff portal, ISC all-hands staff meetings, ISC Management meetings.

4. Client Engagement and Marketing

- Survey clients to learn where their service offerings are currently hosted and what their cloud strategy is.
- Identify opportunities to partner with clients who are implementing their own cloud first strategies. (IE: Work on AD in the cloud together.)
- Survey clients to identify their needs/concerns/requests/goals.
- Host reoccurring client meetings to discuss the Cloud First program and gather feedback about it.
- Work with project teams to coordinate client focus groups to review vendor choices and service feature requirements when considering moving services to the cloud. Identify opportunities to combine various project interests into one focus group when possible to prevent overburdening clients.
- Develop marketing materials and a marketing plan including:
    - Articulate value to clients, define problems and benefits, service differences (ie: cloud vs on-prem) and describe costs
    - ISC Brochure

*Quick wins highlighted with **

Resources

Role/Skill	Estimated Person Months
Communications Team	½ of an FTE throughout the duration of the Cloud First program.
Client Engagement and Relationship Management	1 day a week (25-28 hours) throughout the duration of the Cloud First program.
Campus Initiatives	10-15 hours a month throughout the duration of the Cloud First program.
Client Care	Consultant role as needed throughout the duration of the Cloud First program.
CIO Office	1 day a month (5-8 hours) throughout the duration of the Cloud First program.

CLOUD FIRST PROJECT PLANNING

Issues, Challenges & Dependencies

- How do we communicate to clients often and manage expectations as things change over the course of the program?
- It will be a challenge to make sure the communications are meaningful and audience specific for both clients and ISC staff.
- The Staff Engagement aspect of this project will be related to the work that the Organizational Change project will be doing with staff.

Consulted individuals (beyond the cloud team)

- Jim Choate - Marion Campbell - Donna Milici - Jaron Rhodes - John Mulhern III - Denise Lay - Tiffany Hanulec	- Client Services Leadership Team: West Phinney - Kristen Nelson - Mike Morris - Amy Phillips - Dawn Augustino

CLOUD FIRST PROJECT PLANNING

Migration and Prioritization

Lead Name: Bill Gilmore

Scope

Within Project

- Establish Migration approach:
    - New Applications - “Cloud first” policy for new applications
        - Preferred order: SaaS, PaaS, IaaS, local-hosted
        - Perform Fit/Gap for cloud considering all factors: scheduling, support, integration, security, performance, networking, infrastructure, contracts, etc.
        - Select candidate/pilot apps for early cloud implementation
    - Existing Applications - Review, group and identify existing apps that are candidates for cloud migration (Leverage App Rationalization inventory)
        - Select candidate/pilot apps for early migration
        - Per app – Perform Fit/Gap for migration considering all factors: scheduling, support, integration, security, performance, networking, infrastructure, contracts, etc.
        - Identify “sunset” policy for older applications with short expected life.
- Establish Decision Matrix/Checklist for cloud migration
- Recognize current cloud apps for successes and lessons learned (e.g. Office 365, Concur, Hyperion)
- Adjust strategy as lessons learned

Outside of Project

- Touch points that are primarily in scope for other teams
    - Establish new development framework (Dev/tools team)

CLOUD FIRST PROJECT PLANNING

Deliverables

1. Cloud Migration Strategy
2. Decision Matrix/Checklist for cloud migration
3. Work with Rationalization data/team to identify early migration candidates*

*Quick wins highlighted with **

Resources

Role/Skill	Estimated Person Months
Project Leader	On-going
Project team	On-going

Other Resources

1. MoonShot teams: Security, Networking, App Design and Tools, Integration and IAM, Contracts, Organizational Change
2. Gartner documents
3. Educause series

Issues, Challenges & Dependencies

- Reference: see Breakout teams data

Consulted individuals (beyond the cloud team):

• Tiffany Hanulec	• App Rationalization team (Bruce DiBonis) • Cornell University (Brett Haranin)

CLOUD FIRST PROJECT PLANNING

Infrastructure and Architecture

Lead Name: Dave Tenney

Scope

Within Project

- Infrastructure Design
    - Provide structure around cloud vendor and on premises deployments including monitoring, management, high availability, and self-service.
- Network Integration
    - We need reference architecture for prospective cloud vendors and on premise. This would include Performance and Network Security.
- High availability, elasticity, and redundancy
    - Provide technical standards for redundancy and failover, both within and outside of a cloud vendor, including exit strategy and data resiliency.
- Per vendor and on premise specific automation strategy
    - Utilize each vendor and on premises specific resources and tools to allow for optimized but standard based deployments.
- Reallocation of current infrastructure usage
    - Identify new uses or a method of cost recovery for hardware investments that have an expected service life longer than the respective services' migration to the cloud

CLOUD FIRST PROJECT PLANNING

Deliverables

1. Infrastructure Design

- Collect best practice standards from public cloud vendors*
- Collect and review previous public cloud deployments for consistencies and consolidations*
- Research public and on premise vendors for provided specific solutions*
- Provide a technical template for reviewing potential support for new public cloud and on premise vendors
- Identify public cloud vendor SLAs, incident management responsiveness and criterial for evaluating vendor's offerings
- Provide a standardized toolset for resourcing public and on premise cloud options, including templates and documentation for implementation
- Provide an automated, centrally managed and monitored, simplistic and replicable design across public cloud vendors and on premises
- Provide technical education for implementers to level up skill sets
- Research per public cloud vendor and on premise specific automation strategies for best utilization

2. Network Integration

- Collect current network diagrams for discussion to vendors for review and integration*
- Provide a performance metric template for new vendors
- Determine methods for interconnecting vendor and on premise networks
- Investigate methods for securing networking interconnects
- Provide recommendations on monitoring networking interconnects
- Determine bandwidth requirements for different vendors
- Determine and analyze ISP failures and the effects on networking interconnect
- Produce network diagrams showing potential interconnect methods
- Provide strategic redundancy designs to allow for ISP and local network structure failures
- Research campus initiatives for alignment in strategies and timing for transitions
- Research campus initiatives to align strategies and timing for network dependencies including Internet2 and direct connect cost savings

3. High availability, elasticity, and redundancy

- Identify public cloud and on premise offerings for redundancies across multiple physical locations

- Provide strategy and documentation around data protection across multiple vendors to safeguard Penn's data against cloud risks
- Provide potential layers of failover for services, including on premise and public cloud redundancy and data replication

4. Reallocation of current infrastructure usage

- Collect and provide information regarding the life expectancy of current hardware for review*
- Identify locations and spacing including on and off premises for current and future availabilities
- Define support requirements for services and equipment that will remain on premises and services that are transitioning to the public cloud, including decommissioning of services and equipment
- Provide a list of templates that will streamline the intake and export of services and hardware from clients to on premise or cloud resources
- Provide a list of redundant equipment and potential mitigations for transition

Resources:

Role/Skill	Estimated Person Months
IT Project Leader	High
Systems Administrator and Engineer	On-going
Database Administrator and Engineer	On-going
Networking Operations and Engineer	On-going
Storage Administrator and Engineer	On-going
Software SME's	On-going

Issues, Challenges & Dependencies

- Infrastructure Design
  - Challenges debugging problems between vendors and on premises to vendors
  - Dependency on application design and how it relates to the underlying infrastructure design
  - Cloud to cloud interoperability is limited based on vendor strategies
- Network Integration
  - Mechanisms and processes to ensure architecture design to stay secure
  - How much detail do we want to provide to vendors about network structure
- High availability, elasticity, and redundancy

CLOUD FIRST PROJECT PLANNING

- Inclusion of Mission Continuity procedures and precepts into the design
- Current and future gained resources and requirements from clients
- Continued support for change management, asset management, compliance and regulatory risk management throughout the transition process

Consulted individuals (beyond the cloud team):

• Tiffany Hanulec • Dane Fetterman • Justin Ettore • Jerry McDonnell • Michel van der List • Dave Dimm • Daniel Hawryschuk	• John O'Brien • Charles Rumford • Dan Sheehan • Paul Gentile • Greg Hartley • Jeff Ballentine

CLOUD FIRST PROJECT PLANNING

Integration and IAM

Lead Name: Janet Lind & James Brewer

Scope

Within Project

- IAM
    - SSO (currently PennKey) implementation support for applications/services making transitions to cloud-based services
    - Direction on and support for AuthN/AuthZ and federated identity systems (common industries/technologies/approaches)
    - System-system integration/credentials/identity management (including documentation/inventory of the various situations involved)
- Data Integration beyond IAM
    - Data integration support for applications and/or services making transitions to cloud-based services (beyond SSO/IAM: importing Penn data into an application; exporting Penn data out of an application, often from or to the data warehouse but frequently multiple sources/destinations involved).
    - Development of standards/best/preferred practices for data integration
    - Exploration/experimentation with job scheduling options involving cloud solutions as source or/and destination

Examples: Canvas needs data about courses and student enrollments; Admissions needs test scores imported from the testing services; many applications need to feed data back to Penn's data warehouse; many research administration applications feed data between themselves and the warehouse; employee data in the warehouse is integrated into many applications including those provided by benefits vendors.

Outside of Project

- Important but not foundational, or requiring specific projects
    - Data Warehouse cloud strategy (will become its own project, if/when "clouding" the warehouse becomes a discussion)
    - Penn Community policy or strategy (likely a "next generation" Penn Community project)
    - PennKey/SSO strategy long-term (IAM team project: immediate and short-term SSO support ***is*** included in scope, above)

- Definition of key concepts across solutions (i.e., student, employee, etc.) as different vendors may have different concepts and Penn has its own as well
- Development of a "master data utopia" of critical key information about people, address, other important cross-system information
- Formal finalized job scheduling strategy/direction (a project exists to explore options and possibly proceed with product selection)
- Develop a process by which client/data steward signoff is explicit (overlap with Migration team? Or does this belong with the procurement/contracting process?)

Deliverables

1. IAM

- SSO documentation covering common options and steps for project team; include definitions and examples, recommended best practices
- Direction on federated identity systems; recommendations (direction and best practices around common industries/technologies/approaches)
- SSO “community of practice” implementation team that can be called on by any application or service project needing support for, or in addition to, above

2. Data Integration beyond IAM

- Document set of best, or at least preferred, practices and processes around data integration with the goal to standardize as much as possible; as a by-product, to remediate the “integration flavor of the day” current state*
  - Short-term: Inventory of what’s already been done for existing cloud solutions, with some indication post-implementation of level of satisfaction, benefits, outstanding issues, traps to avoid*
  - Short-term: As the ETL Analysis project recommendations become available (mid-summer), update best practices with Penn’s decisions about implementing those recommendations (may involve overlap with the Applications team)*
- Provide expertise to the Procurement team on a standard set of RFP questions to be included in an RFP template (overlap with Procurement team)*
- Enable a dedicated (i.e., this is their first priority) consulting team, containing at minimum a warehouse/Oracle/SQL expert and a developer expert/architect to help project teams doing cloud implementation (both new applications and migrations of existing applications):

  - Ensure that individual RFPs are framed to meet any application/project-specific needs*
  - Evaluate data integration portions of RFP responses and identify areas for follow up*
  - Provide support to implementation teams in the data integration design phase of cloud migrations using above-discussed preferred practices
- Consider key information needed to be available for integrations, reporting, etc.; are there standard data points/data sets (name, PennID, PennKey, etc. or an idea similar to Employee_General) many vendors will need that we can provide in standard ways?
  - Document standard way/s Penn can/will make this data available to cloud solutions
  - Best practices on use of Penn Community as starting point of integration for data about people and affiliations (beyond IAM usage)
  - Develop a documented policy and repeatable process for providing data warehouse (or other system) credentials to vendors that addresses documentation of credentials, levels of access, revocation of access, periodic review or renewal of credentials, etc.
- Firewall/VPN designated team to support ingoing and outgoing connectivity between vendors and Penn systems (overlap with Network Architecture activity but critical to integration); (CourseEval an example of need)

Quick wins highlighted with *

Resources

Role/Skill	Estimated Person Months
PM to coordinate all Integration/IAM deliverables	Medium-Big
PennKey/SSO skillset	Small-Medium, exists
Data Integration/ETL/Oracle/etc	Medium
Data Integration/ETL/developer expertise	Medium
VPN/DBA support	Small, episodic

Other Resources

- Possibly more flexible VPN solution to support vendor-specific integration requirements

- Collaboration tools that can be extended to vendors (Box is good; Confluence would be great but appears to be intended primarily to ISC); need clearly defined repository for documentation that needs to be shared between Penn and vendor (configuration specifics, business rules, contacts between Penn, vendor, etc.)

Issues, Challenges & Dependencies

- Penn culture problem: we need evangelism to the functional director/manager level (not just the VPs and Deans) to help clients understand that integration/IAM issues can't be "we'll deal with them later" considerations when solutions are under consideration or implementation plans are being developed; must be "top tier" issues for consideration
- Does the data warehouse take on another role, that of being a Penn-based repository/archive of data that Penn could risk losing to a cloud vendor gone dark? If so, how does this change our current data integration assumptions? Follow-up comment: The above has been discussed during projects. So far the outcome in consultation with Purchasing has been to ensure having clear language in the contract about who owns the data and how it can will be made available to Penn if the vendors ability to provide service is disrupted for any reason. Definitely something that should be explicitly considered in each case. What do we do if the contraction conditions can't be met because some small but important vendor stops answering the phone?

Consulted individuals (beyond the cloud team):

- John Breen (IAM) - Tiffany Hanulec - Bryan Hopkins (lots) - Chris Hyzer - Jeanine Kleba - Jim Johnson	- Amy Miller - John Mulhern - Rosey Nissley - Isobel Thompson - Michel van der List - Donna Milici / team

Also: integrated commentary derived from interviews (approximately 30 individuals, mostly AIS, some TS, ES) conducted by Anexinet consultant doing analysis of ISC's ETL processes. Included lots of questions about standard processes and toolsets and integration with job scheduling changes needed to support Cloud initiative.

Interesting comments/questions to not lose track of:

- Is it possible have single definitions of entities like student, faculty, employee? Opinion on the continuum, but one: for instance maybe we could have the eduperson affiliation

to be a broad inclusive definition of these, and maybe we could map to that affiliation on a per app basis.

- Might want to differentiate between just-in-time provisioning and just-in-case provisioning.
- SCIM is a standard for exchanging person and group data that Penn State and Internet2 are adopting, I highly suggest looking at that. Penn State also has some open source software to make integrating with SCIM easier. Not that we are in solution mode right now, but just mentioning.
- We should also mention synchronous vs asynchronous communication; both are very valuable.
- We need documentation/definition of best way or only way to get certain master data like PennNames, PennID's, COA combinations, etc including any limitations (timing, availability, etc.)
- Does the integration support include a sort of framework with common components like there is today with the ESB?
- I think there needs to be more exploration of data migration capabilities by the vendor before contracts are signed. For example, on a specific project we don't know whether or not a vendor has capability to receive ongoing integration data vs. one-time load at implementation time, with an expectation that Penn would then manually add any new info later instead of having an ongoing integration process.

CLOUD FIRST PROJECT PLANNING

Organizational Transformation

Lead Name: Deborah Sartin

Scope

Within Project

- Determine required skills, competencies and identify staffing requirements to support cloud environment.
- Conduct process and tools analysis to determine changes and gaps to support cloud services.
- Access organizational structure requirement to support cloud first strategy (i.e. training and support).
- Identify organizational change requirements.

Outside of Project

- External staff to ISC

Deliverables

1. People
   - Conduct Nine Block (talent assessment tool) matrix to determine skills assessment for critical roles
   - PIQs for new positions
   - Requirements gathering/documenting – still need to understand what we want in order to evaluate the cloud product offerings. More people may need to be trained as BAs, system integrators, etc.
   - Assist with Cloud Implementation expertise – in areas such as acceptance testing, communications, support, training, etc. Cloud products may be available quicker but is the department/users?

2. Tools
   - How to evaluate competing cloud vendors (e.g. what measures do we use, viability, existing relationship may count more than previously, integrate-ability)?
   - Tool to document Requirements →Results of Product evaluation → Gaps and Gap Resolutions → Test Plan(s)
   - Need a knowledge base for cloud computing for use by clients
   - Fundamentals Cloud class for all of ISC
3. Process
   - Use the Cloud First initiative as a prototype for the One ISC Service Delivery model. Moving the various projects through all areas of the organization.

CLOUD FIRST PROJECT PLANNING

- Product evaluation – scale based on size, impact of solution, setting evaluation criteria and measuring vendor offerings against it (and how to keep the process above board)
- SLA monitoring may migrate from IT to operational area - how do we prepare them to manage/track and adjust their SLA to get the most bang for their buck?
- Address any operational inefficiencies that may inhibit progress

Quick wins highlighted with *

Resources

Role/Skill	Estimated Person Months
HR	
Training	
Staff Rep	

Other Resources

1. Consult with Gartner, Lynda.com and peer institutions (Stanford, Princeton, Duke) for recommendations and resources*
2. Use recommendations from the Application Rationalization project
3. Conduct focus groups for immediate, short term and long term needs*
4. Univ. HR Training – Tom Sontag
5. IT Academy

Issues, Challenges & Dependencies

- Timing
- Prioritization
- Coordinate dependencies with other cloud first projects

Consulted individuals (beyond the cloud team):

• Marion Campbell • Dawn Augustino • Rosey Nissley • Anita Gelburd	• Coleen Cawley • Stu Benoff • Denise Lay • Jacquie Koury Raynor • Adam Cranston

CLOUD FIRST PROJECT PLANNING

Contract & Procurement

Lead Name: Dave Mongeluzi

Scope

The Cloud First policy will require ISC to default to cloud-based solutions whenever there is a secure, reliable and cost-effective cloud option. Effectively procuring and managing cloud services requires us to develop contracts that address business and security risks as well as create and support a framework to monitor Penn and cloud service providers' responsibilities

Within Project

- Contractual language – Develop contractual language to address major categories of concern such as:
  - Security and compliance as it relates to SPIA, HIPPA, FERPA, & Breach Notification
  - Data ownership as it relates to location, storage & access
  - Operations, Support & Availability as it relates to vendor support models, system availability scheduled updates & system changes, business continuity and DR
- RFP requirements – Develop general RFP requirements for PaaS, SaaS and IaaS including but not limited to:
  - IAM and Data integration requirements that can be plugged into any RFP and baseline acceptable SLAs
- Tools and baseline data – Develop a set of tools and data sets to streamline the procurement process, including modifying contract inventory system for cloud based contracts, developing Penn stats for vendors and vendor/contract "no go" decision criteria

Outside of Project

- Building vendor relationships
- Determining strategic vendor list
- Determining service specific SLAs

CLOUD FIRST PROJECT PLANNING

Deliverables

1. Contracts – Contractual language to address major issues below, including but not limited to:
   - Security and Compliance baselines and language with regards to
     - SPIA, HIPPA, FERPA, etc
     - Data ownership, location, storage, access and unwinding at expiration (international, local, mobile, encrypted, import/export capabilities)
     - Business Continuity and DR
     - Breach Notification
   - Operations, Support & Availability - Develop baseline support & availability requirements including but not limited to
     - Vendor support model requirements including but not limited to troubleshooting team, lines of support (tiered), and specific contact points (including escalation of critical issues)
     - Availability requirements including language around updates, downtime, system changes
     - Baseline acceptable SLAs?
2. RFPs – Develop baseline RFP requirements for PaaS, SaaS and IaaS including but not limited to:
   - IAM requirements that can be plugged into any RFP (PaaS, SaaS, IaaS)
   - Data integration requirements that can be plugged into any RFP
3. General
   - Modify contract inventory system for cloud based contracts*
   - Develop Penn Stats for vendors*
   - Develop vendor/contract "no go" decision criteria*

Resources

Role/Skill	Estimated Person Months
Shared Services – Contract Group	

Other Resources

- OACP (Scott Schafer)
- OGC (Bob Firestone)

CLOUD FIRST PROJECT PLANNING

- InfoSec (Josh Beeman & Mike Sanker)
- Purchasing (Brent Friedman)
- Risk Management (Jim Amendola)

Issues, Challenges & Dependencies

- Challenges – Resources are limited; vendor has existing agreement in place with other schools/centers and our ability to negotiate may be compromised
- Dependency – Mike Sanker and the Security Team
- Issue – may not get Penn specific language with large vendor agreements (AWS, Internet2, Net+)

Consulted individuals (beyond the cloud team)

• Brent Friedman • Mike Sanker	• IVYPlus VMO • IVYPlus Security

ISC staff expressing interest

- Vicki Fullam
- Paul Gentile (OLA/SLA, Business Continuity/DR)
- John Breen/Garrick Hamlin (IAM language issues for contract agreements)
- Peggy Duffy (Developer integration – avoid issues we experienced with Microsoft/Ceryx)

CLOUD FIRST PROJECT PLANNING

Security and Risk Management

Lead Name: Mike Sanker

Scope

Within Project

- Vetting and Approval (Processes and Tools): Establish a formal methodology and the necessary tools for vetting and approving all cloud related solutions
- Broad Awareness and Buy-in: Engage key campus stakeholders who are authorized and can help accept institutional risk
- Staff Engagement & Training: Facilitate an environment of continuous, rigorous training and guidance to lower the risk of errors and ensure security best practices.
- Strategic Commercial Tools and Partnerships: Where possible, engage 3rd parties (e.g., Cloud Security Access Brokers) to support security and compliance.
- Cloud Security Principles, Best Practices & Standards: Learn, document and pursue the means to ensure the confidentiality, integrity and availability of Penn data when using cloud services.

Outside of Project

- Mandating compliance
- A University-wide Data Governance program
- Developing training materials

Deliverables

1. Vetting and Approval (Processes and Tools):
    - With Penn Privacy and key campus stakeholders, develop and publish a Penn Data Classification schema.
    - Establish a working group to develop a realistic and repeatable process for vetting and approving Cloud services in Penn's decentralized environment in accordance with the proposed "Cloud First" approach.
    - Review and refine (as necessary) existing tools, such as SPIA for Vendors and the Cloud Master Services Agreement.

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2. Broad Awareness and Buy-in:
    - Draft a brief summary of ISC's Cloud First approach that clearly addresses the potential implications for accepting new/different risk.
    - Share and discuss this document with those key (non-ISC) stakeholders who are authorized and can help accept institutional risk, e.g, OGC, Purchasing, OACP, etc. Acquire acknowledgement of ISC's intent to proceed with the Cloud First approach.
3. Staff Engagement & Training:
    - Develop a statement of policies and principles for training with overall Cloud First goals
    - Create a working group to determine effective and worthwhile training programs
4. Strategic Commercial Tools and Partnerships:
    - Consult with Gartner to produce a list of market leading cloud security providers
    - Draft a white paper describing vendors, services, features/benefits and costs for leading 3rd-party cloud security providers. Examples include Cloud Access Security Brokers (CASB), 3rd-party vendors who assume regulatory/compliance burdens (e.g., FedRamp, ClearData, etc.), virtual detective and preventative services.
5. Cloud Security Principles, Best Practices & Standards:
    - Identify key staff, subject matter experts and stakeholders who need to provide input and/or be trained on cloud security principles, standards, etc.
    - Through external training, peer discussion and self-study identify and document the key principles for implementing information security in the cloud. This should include (but is not limited to) addressing matters of data ownership, incident handling, secure access, transmission, storage, retrieval and destruction of Penn data.
    - Where possible and needed, develop and publish standards and default contractual requirements for individual topic areas listed above.

Resources

Role/Skill	Estimated Person Months
CIO	Low
Contracts	Low
EVP	Low
Provost	Low
CISO	Low
Office of General Counsel	Low
University Privacy Officer	Medium

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Role/Skill	Estimated Person Months
IT Purchasing	Low
HIPAA Privacy Officer	Low
Information Security Analyst	High
Network Policy Committee members	Low
ISC Cloud Platform, Infrastructure, Software SME's	High
University Cloud SME's	Low

Other Resources

- Gartner
- Cloud Security Alliance (CSA)
- Amazon Training and web-resources
- IU Data Classification Matrix: https://datamgmt.iu.edu/types-of-data/classifications.php
- Ivy+ Security

Issues, Challenges & Dependencies

- Reliance on non-ISC parties (e.g., Privacy Office, General Counsel) and processes (e.g., Network Policy committee) to complete deliverables.
- Rapidly changing solution space/environment (e.g., AWS Services) can make it difficult to master technologies.

Consulted individuals (beyond the cloud team)

• Jim Choate	• Brent Friedman