

# OneIT@Iowa Status Update - DCS



## Project Details

**Project Name:** Data Centers and Servers  
**Project Team Leads:** Guy Falsetti, JJ Ulrich, Jerry Protheroe  
**Project Manager:** Kris Halter  
**Reporting Period:** 10/10/2015 – 01/15/2016

## Project Life Cycle - Phases

Item	Phase 1 – Initiation	Phase 2 – Planning	Phase 3 – Implementation	Phase 4 – Close Out
<b>Timeline:</b>	4/13/2015 – 6/18/2015	6/19/2015 - 10/16/2015	10/19/2015 – 08/01/2018	08/02/2018
<b>Status:</b>	On Track	Attention Required	Attention Required	
<b>Completion:</b>	100% Complete	100% Complete	31.25% Complete	0% Complete

## Executive Summary

Overall Status:	Status	Notes
<b>Schedule:</b>	Attention Required	The Planning phase has been extended due to additional server rooms being discovered and needing to be audited, bringing the total from 36 to 53. This is a multi-year project extending into 2018, the overall timeline is at risk if funding is not approved and relinquished.
<b>Budget:</b>	\$2,060,000	The approval of the budget has not been communicated to the team, causing the project to default to lift and shift of servers which has greatly accelerated the accumulation of servers into ITF putting it on track to reach its capacity before the end of this project. The lack of funds will also significantly reduce our total savings and potentially cause catastrophic issues when moving old equipment. The high level project budget was outlined in the project Charter with a schedule of release of funds over the next 2 years for facility, server, and network upgrades to facilitate the consolidations. \$300,000 of the requested budget will be a reoccurring expense for the support of 3 lines consolidated from other departments, to handle the influx of additional server support needs within ITS during and post consolidations.
<b>Risks:</b>	Attention Required	Without approval for funding the project will need to heavily rely on using a Lift and Shift process for consolidating server rooms which will dramatically affect our cost savings abilities. The OneIT reporting structure has a significant impact on the OneIT Data Center and Server project. With the project requiring a high amount of labor, up front capital expenditures, reoccurring expenditures, and a high political footprint, broad and inundated executive and collegiate support and backing is highly critical for the success of this project.
<b>Issues:</b>	Attention Required	There was significant push back from specific researchers, colleges, and IT leaders on consolidation of any servers and rooms within their area or jurisdiction. Most of these issues are being worked on, on a case by case bases.

# OneIT@Iowa Status Update - DCS

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## Phase 2 – Planning

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**Phase Status:** In Progress  
**Phase Start Date:** 06/19/2015  
**Phase End Date:** 10/16/2015

### **Accomplishments**

#### **Audits:**

- Finalized the scheduling of all macro inventories of server rooms on campus.
  - 43 MEP Macro audits have been completed. This is an increase of 1 rooms from the last report. A total increase of 7 from the initial plan.
  - There are an additional 10 server rooms in need of being MEP Macro audited which brings the total to 53 rooms.

#### Quick facts:

- 43 Server Rooms were audited
- Involved 31 campus buildings
- A total of 25,475 sq. ft. represented by server rooms
- Estimated \$1 million dollars being spent on server power and associated cooling.
- 2332 physical servers counted

The breakdown for the 43 server rooms (Definitions below):

6	Data Centers
1	IT Class Server Room
24	Basic Server Rooms
12	Non-Dedicated IT Hosting Spaces

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**Data Center** - Dedicated computing space for hosting IT equipment in a rack-based configuration greater than 1,000 square feet with card-access security provided by Central Security. The space must also have dedicated N+1 or better uninterruptable power supply (UPS), dedicated cooling in an N+1 or better configuration, and should have a dedicated generator.

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**IT Class Server Room** - Dedicated computing space for hosting IT equipment in a rack-based configuration less than 1,000 square feet with card-access security provided by Central Security. The space must also have dedicated uninterruptable power supply (whole room) and dedicated cooling and must not have any significant site risks (water pipes above, janitor's sinks, etc).

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**Basic Server Room** - Dedicated room for hosting IT equipment, but is deficient in not more than one of the following -- card-key security access, dedicated UPS (whole room or cabinet based), or dedicated cooling, or has significant site risks.

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**Non-Dedicated IT Hosting Space** - Space used for other purposes in addition to hosting servers, storage, or network equipment and typically does not provide dedicated security, power, or cooling.

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### **Community Updates:**

Data Centers and Servers – Status Report

Page 2 of 7

# OneIT@Iowa Status Update - DCS

- Developed a prioritized list of server rooms to focus on next for decommissioning.
- Finalized the document and agreement for work that is to be performed by Facility Management and ITS-Physical Infrastructure on all rooms that are decommissioned. The agreement outlines what will be done to each room to bring it to its base state so the departments may utilize the room for additional purposes.
- Previous TPS reports have been posted to the website.
- Project Plan was posted to the website for community feedback.
- Presented Project Plan, Macro update, and CORS request for funding to the Steering Committee for feedback and approvals.

## **Milestones**

- Finalized project plan. Posted to the OneIT Website.
- Completed original and first additional set of server room MEP Macro audits.

## **Miscellaneous:**

- Developed a DCS award and have distributed the medal/award to a number of personnel.

## **Upcoming Milestones**

- Complete remaining Macro/MEP level audits of server rooms across campus, currently scheduled for completion, February 2016.
- Secure funding and resources to aid in the consolidation of 53+ server rooms.
- Decide on which server rooms will remain and transform into an enterprise level community data center.
- Finalize the details and policies on an incentive program for outdated/unsupported research equipment.

## **Planned Work**

- Audit 10 newly discovered server rooms (February 2016).

## **Matters for Steering Committee Attention**

- Funding approval of needed Server, Network, and Facility upgrades.
- Funding approval of 3 lines to manage migration and support of servers within ITF.
- Decision on how to handle the research equipment incentive program.

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## Phase 3 – Implementation

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**Phase Status:** In Progress - Attention Required  
**Phase Start Date:** 10/19/2015  
**Phase End Date:** 08/01/2018

## **Accomplishments**

### **Enterprise Data Center Enhancements and Expansion to Support OneIT:**

- Implemented new power whip runs for Cisco ACS cabinets at LC data center, on the 15<sup>th</sup>.
- Research PDU additions at ITF got commissioned. The process involved placing significant loads on the newly installed components – primarily the floor PDU and the newly energized Starline busways.
- Networking 2.0
  - DCS has reached out to external networking experts to begin looking at how to go about and what changes are most recommended to support our multitenancy enterprise classed DCs.

# OneIT@Iowa Status Update - DCS

- Met with networking group to plan for Network 2.0 restructure. One of the major objectives of Network 2.0 is to support the growing needs of multi-tenant data centers being driven by the OneIT Data Center and Server consolidation project.
- Presented network redesign for campus to the OneIT Steering Committee, OneIT DCS Advisory Committee, and to the IT Admins.
- ITF Tape Library
  - The ITF Tape Library was successfully moved on December 1<sup>st</sup> to better support our infrastructure and customer needs.
  - Power and networking infrastructure updates were implemented on 11/16 to support the ITF Tape Library move.
  - Networking configurations for ITF and the Tape Library were altered to support the ITF Tape Library move.
- CIC Institutions
  - Jerry visited Indiana for the CIC Operations and Infrastructure (OAI) meeting and came back with an abundance of best practices from the other organizations.
  - ITS gave a tour to CIC CIO Tech Forum participants a tour of ITF. Rave reviews of ITF were received from the other schools that participated in the tour.
  - Discussions with University of Illinois on Data Center Consolidation best practices, they started down this journey in 2012 and have decommissioned over 40 server rooms since.
- ITS and FM has initiated a partnership with Department of Energy (DOE) and their Better Building Data Center Partnership initiative program so as the UI and DCS can access the DOE for their expertise on energy usage in data centers. Agreements on what our commitment would be, what the DOE commitment would be and what our next steps are, sign off on agreements, reviews of DOE manual, participation in a kick off meeting, entering base line data have been completed. The next steps are to begin energy savings initiatives, and showcase ITF to DOE and partners.
- Infrastructure Day's document for the next year's dates was finalized and shared with the appropriate people and has garnered positive feedback. The team developed and documented the calendar in a way that future calendar years development (2017 and beyond) would be streamlined. They considered multiple factors in selecting dates – the academic calendar, athletic calendar (Hawkeye football game days), team individual's knowledge of their faculty and staff constituents and Infrastructure Day history.

## **Campus Server Room Migration Updates:**

- Approved for initial funding for some server replacements (\$20,000).
- Chemistry Building
  - Finalized and received approval for scope of work for the conversion of the three Chemistry Building server rooms. The Chemistry Building has already laid out plans for what they will be utilizing the rooms for next.
  - Exercised server room decommission process with FM and Physical Infrastructure on the first three vacated server rooms in Chemistry Building.
  - The decommission project efforts we will managed by the OneIT DC SC Facilities Management partner.
  - Server hosting agreement was negotiated between ITS/DCS and Chemistry professors. This centers around what ITF will and won't do and what the professors are responsible for and how the research equipment and supporting equipment will be funded and supported. This agreement will also act as a future template with other researchers.
- College of Public Health - UCC2440
  - Equipment has been retired, virtualized, and migrated out of the COPH – UCC 2440 server room.

# OneIT@Iowa Status Update - DCS

- UI Surplus has removed excess hardware in support of the decommissioning of UCC 2440 (COPH).
- COPH approved the FM and ITS base conversion/decommission scope for their room and FM and ITS-EI have begun work on the decommissioning of UCC 2440 (COPH).
- Biology Building
  - Completed the Biology Building's migration and retirement and virtualization of computing systems out of their server room.
  - Agreement on the FM and ITS base conversion/decommission scope for their room was approved. The room is planned to be converted into a research lab requiring minimal infrastructure changes.
- Tippie College of Business
  - Scheduled decommissioning planning meeting for the College of Business.
  - The OneIT DC SC team conducted introductory decommissioning planning meeting for the College of Business. We covered many topics during the meeting, including why we are doing these decommissions, what our mission is, what we do, what ITS and ITF have to offer, and what the server room owner would like to do They have agreed to consolidate, transfer to VMs, and migrate all of their equipment, as best meets their service needs..... We will be planning on the decommissioning of this room this spring.
- College of Law
  - Met with law for Decommissioning planning.
  - The FM and ITS base conversion/decommission scope for their room was approved.
- Seamans Center 1309
  - Met with Prof. Todd Scheetz of engineering and his research staff to lay out the moves of the WIVR systems (SC1309). Next steps were laid out along with some longer term transitions and consolidations for WIVR systems.
    - Hostmaster (AJ) has laid out the hostnames to IPs for the system move, configure the ITF co-lo switches, and the IP blocks have been granted to WIVR.
    - Agreement on access to ITF was reached, after walking them through the partnership aspect of the relationship, remote access tools, remote hands and Data Center Guest access process, WIVR support staff were more than willing to give "no physical access" a try. And further didn't expect there to be any issue with it.
    - Basic requirements (DNS, firewalls, equipment location) and time lines (ITF on Dec. 5th, SC on Dec 12th, ERMB backups week of the 14th) have been laid out for the migrations.
  - Multiple meetings and much prep work was conducted in preparations for moving the CLCG research lab (SC1309) equipment into the Engineering server room on December 12th. With the 1309 SC server room migration, there was an extremely short timeline to plan and execute the server migrations (December 31st deadline). Further complicating the move was the fact that services provided by the servers are heavily used during the week, forcing the move to a weekend and leaving very little room for error and delays.
  - Relocation of 7 WIVR equipment in SC1309 to ITF on December 5th went fairly well. It was necessary to return one server to 1309 SC and not move another due to an unforeseen personnel issue. An alternate plan was put into place to house the machines in the Engineering server room until the issues could be resolved. WIVR staff, Engineering Staff, and ITS staff all are pleased with how this complicated transition was implemented.
  - Relocation of 26 CLCG equipment in SC1309 to the Engineering Server Room on the 12th went without issue.
  - Two WIVR back-up servers were relocated to EMRB 74 on Monday, December 14th.
  - 15 machines were virtualized or retired during the process.
- CORS Upgrade

# OneIT@Iowa Status Update - DCS

- Outdated servers and storage at the Center for Disabilities and Development (CDD) is the holdup of the shutdown of their server room. To relocate the equipment, there will need to be an upgrade of the Interview Recording System (CORS) at a onetime cost of \$25.5k with ITS/DCS picking up \$20K for the required equipment, CCD covering all annual maintenance costs, \$3k, and splitting the camera updating costs of \$5.5K (to support SSL based on ISPOs recommendations). Planning for this incentive and buildout is being worked on.
- A project plan and funding proposal has been drafted and will be presented to CLAS and the OneIT Steering Committee for feedback and approval.
- Continuation of meeting with the HPC and Storage teams, to keep them up to speed on the project and share our macro level audit results so they can assist in any moves of equipment that fall under their jurisdiction. There were no new HPCs identified that the HPC group was not already aware of and there were a few low hanging rooms that were primarily storage systems that the EFS group will be assisting on. There will be involvement of other teams when Micro Audits and decommissions of rooms consist of heavy storage needs or HPC requirements.
- Retired a Beowulf cluster, rack of equipment, in the research row of ITF for the Department of Statistics Actuarial Science during the winter break which has freed up rack space for additional usage.
- Next round of server rooms to be decommissioned has been identified and divvied up amongst project team members.
- Letters were sent out to additional server room owners notifying them of the next steps in the decommissioning process and conversion of the server rooms back to their base form process.
- University of Northern Iowa Upgrades
  - UNI installed additional equipment in their two cabinets at ITF on Friday, 10/23.
  - Consolidation of 12 UNI servers into ITF.
  - From a recent triumvirate meeting with UNI/ISU/Uiowa
    - Discussions around hosting a third rack for UNI. Existing two racks are nearly full
    - Uiowa to share our macro audit spread sheets with UNI/ISU to help them calculate cost savings be decommissioning a server room
    - Coordinated on new shared training opportunities with UNI/ISU/Uiowa
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## Miscellaneous

- A College of Dentistry success story on their data center and server consolidation efforts was shared with the campus community via Iowa NOW.
- A success story from the College of Chemistry featuring Claudio J Margulis, who relies heavily on computation research has recently had a lot of his equipment consolidated and relocated to ITF, he penned a very positive thank you note and faculty endorsement of the work done by JJ and others in support of the DCS project. This letter was expanded into an Iowa NOW article and was shared with the campus recently. This will hopefully go a long ways with our team and the researchers on campus.
- Website was significantly updated with more recent news, sub-project information, and a frequently asked questions and answer section.
- Recognition medals have arrived. First medal was handed out to JJ Urich for his stellar work and assistance on the decommissioning of the Chemistry Building's 3 server rooms.
- Began ITAR compliance planning for when we tackle ITAR requirements. The initial ITAR conversation and planning with Internal Audit was conducted allowing us to form a partnership and utilize their services and expertise to continue compliance as we adjust server rooms and data centers across campus.

# OneIT@Iowa Status Update - DCS

- ITS-EI was setup in TDHE for time tracking of their work for decommissions.
- Investigation began into adding AWS Educate program to our existing AWS/DLT contract via discussion with ISU and what they have done with Amazons new program. This initial discussion cleared up some of our looming questions of how well it works, how their faculty are using it, and what the interactions with DLT as a reseller is panning out and the level of complexation that they add to the mix.
- Presented project updates to the OneIT DCS Advisory Committee. The OneIT Data Center and Server consolidation will attempt to reflect feedback given into future plans.
- Met with Nicole Napoli the Organizational Change Administrator assisting with TIER and OneIT initiatives. Discussed outreach methods to faculty and users of the next set of server rooms.
- Kicked off Data Centers and Servers Governance meeting with the DCS Governance Group. Reviewed current state of affairs, the team's charge, and next set of tasks for the group to complete. The group is made up of various people with stakes in the Data Centers on campus, including HCIS and ISPO and is led by Jerry Protheroe. Next 12 months of Infrastructure days were planned out along with how to handle exceptions.
- Financial data and metrics have been placed in a customized document and format for specific senior IT directors to aid them in communicating OneIT DCS progress metrics.
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## ***Upcoming Milestones***

- Begin converting decommissioned server rooms back into their base form in conjunction with FM.
- Decommission 10 additional server rooms this fiscal year.

## ***Planned Work***

- Test Micro Audit processes on one server room to be consolidated and closed.
- Schedule out next set of Micro Audits

## ***Matters for Steering Committee Attention***

- Funding approval of needed Server, Network, and Facility upgrades.
- Funding approval of 3 lines to manage migration and support of servers within ITF.
- Decision on how to handle the research equipment incentive program.