INTRODUCTION

As is true for major universities across the country, NC State University is increasingly dependent on its information and communication technology (ICT). Up-to-date ICT is needed to attract, educate and graduate students who will be leaders in the 21st century. ICT magnifies the ability of faculty to create and convey leading-edge research and knowledge. ICT fosters outreach, engagement and influence beyond the campus community. And highly capable ICT and ICT staff are indispensable to effectively run a contemporary institution of higher learning that is the size and complexity of a small city. This is especially true at NC State University, North Carolina’s flagship university for science and technology.

NC State’s Office of Information Technology (OIT) was formed in November 2007 as part of the university’s efforts to ensure its continued technological leadership. OIT brought together NC State’s central academic, research, and administrative computing systems and support groups, university data centers and servers, enterprise applications, campus telecommunications (including networking) services, and IT security units. OIT has since been working hard to enhance NC State’s ICT while creating a positive new organization. That process accelerated in the year 2008-09.

In May 2008, after a 10-month national search, NC State named Dr. Marc I. Hoit to be the university’s first vice chancellor for information technology (VCIT) and chief information officer (CIO), a new position “established to develop and execute a progressive information technology strategy for the university.” Dr. Hoit, who is also professor of Civil, Construction and Environmental Engineering, came to NC State from the University of Florida, where he was interim associate provost and CIO.

Dr. Hoit officially took on his new role as VCIT and CIO of NC State and leader of OIT on September 1, 2008. He quickly got to work establishing collegial relationships with college and IT leaders and working to enhance the efficiency and effectiveness of operations of OIT. He soon articulated an ambitious new vision and direction for OIT, which has become even more relevant in the context of the budget and other challenges facing the organization and the university in the coming year.

The first OIT Strategic Operations Plan, published in December 2008, contains the new OIT Vision and Mission Statements:

**OIT Vision**: Be the IT organization people seek out as a partner for providing visionary strategies, creative solutions, objective information, and effective and efficient services in order to help them achieve their mission and goals.

**OIT Mission**: To provide nimble, effective, efficient and collaborative IT services, solutions and strategies in a timely and helpful manner that assists the university, state and nation in achieving their strategic goals.

OIT comprises eight units: Advanced Computing (AC), Eric Sills, Director; Business Services (BusServ), Karen Home, Director; Communication Technologies (ComTech) Greg Sparks, Director; Enterprise Application Services (EAS), Gwen Hazlehurst, Director; Infrastructure Systems and Operations (ISO), John Black, Director; Outreach, Communications and Consulting (OCC), Stan North Martin, Director; Security and Compliance (S&C), Mardecia Bell, Director; and Technology Support Services (TSS), Susan West Klein, Director. Most of the programs and accomplishments highlighted in the rest of this annual report involved the collaborative engagement of staff from multiple OIT units.
SPECIAL PROJECTS AND STUDIES

Strategic Operations Plan: Soon after taking on the role of NC State’s VCIT and CIO, Dr. Hoit began a three-month collaborative process of developing OIT’s first Strategic Operations Plan (SOP). Focusing on improving the operations of OIT, the SOP included OIT vision and mission statements, five goal statements for OIT operations and four strategic projects. The SOP projects chosen and soon launched were:

- **The Student Email Initiative** to review student email services and determine cost-effective options for improvement: Campus Task Force formed, report submitted in March; negotiations with Google Apps for outsourcing student email now in progress. Project led by OCC.

- **The Data Storage and Backup project** to expand and enhance the centralized data storage and backup services OIT offers NCSU: Team constructed shared storage infrastructure and deployed 40 TB of centralized storage to campus clients. Project led by ISO.

- **The Identity and Access Management (IAM) project** to provide a unified, authoritative, secure and cost-effective IAM environment for NCSU’s current and future needs and legal requirements: Progress includes deployment of Shibboleth authentication for inter-campus authentication, identification of consolidated active directory structure, and registration with the nationwide higher education InCommon access control Federation. Project led by S&C.

- **The University Data Mart project** to develop a repository of data and query tools to provide easily accessible decision-support information for NCSU executive officers and others: Project begun in collaboration with University Planning and Analysis and SAS. Project led by EAS.

OIT Expo 2008: Held in October, the day-long OIT Expo was OIT’s first major public event. Many OIT staff worked collaboratively to create a well attended, well run, lively, and informative occasion. The focus was on OIT services, IT challenges, and introducing Dr. Marc Hoit as NC State’s first CIO. An estimated 2,000 people attended the event, and more than 400 attended the keynote address by Dr. Hoit.

IT cost reduction strategies reports: In spring 2009, campus leadership asked VCIT Marc Hoit to look for ways to save at least $1 million in campus IT spending over the next two fiscal years. Furthering the OIT goal of collaborative engagement, Dr. Hoit formed task groups led by college IT directors to assess the feasibility of four IT budget reduction strategies. These groups submitted reports in May 2009. The strategies were found to have merit and are being further investigated. They were: single source campus email; computer labs and student-owned computing; managed desktops; and Web hosting.

Official Audits: Office of State Auditors’ Information Systems and Financials Audits - Successfully conducted with minimal findings. Internal Audit studies of Data Center Environments and Backup Processes successfully conducted. Responses coordinated by S&C; findings reflect identified improvements for processes conducted within OIT’s EAS, ISO, and S&C units.

Classroom Response System feasibility study: Completed in spring 2009, this study enabled Associate Deans for Academic Affairs to choose a campus-wide clicker standard. Project led by OCC and TSS.

MAJOR ACHIEVEMENTS AND MILESTONES

Student and faculty-focused accomplishments in 2008-09
• **Student Information System (SIS)-based Records roll-out:** The implementation of Student Records and Tuition Calc in the new SIS was a major accomplishment that will have far-reaching benefits for students and faculty. 825,000 enrollment records were loaded into SIS with only 22 errors! First semester registration and term end grade posting, graduation and other processes had no significant issues. New Graduate Advising, College of Vet Medicine Admissions and Housing systems were also developed and implemented within SIS. (EAS led these efforts with significant support from ISO, TSS, and S&C units.)

• **New Walk-in-Center (WIC):** Opened in fall 2008, the WIC provides student-focused Help-Desk, ResNet, student phone and cable TV, and workstation support services. There are 2,622 visits from clients so far. (TSS and OCC)

• **New campus-wide antivirus protection:** In 2009, OIT migrated campus from Symantec AntiVirus software. The year-long project involved software testing, site license negotiations, documentation, training, and deployment of new antivirus software for campus and home computers. As of May 19, 2009, 22,000 client workstations were successfully using the new antivirus software. (S&C, TSS, ISO, and OCC)

• **Virtual Computing Lab (VCL) use expands beyond NC State:** In FY 2008-09, more than 10,000 NC State students, faculty and staff reserved the VCL for a total of about 325,000 hours of use. VCL use by people from other NC institutions tripled this year, with ~3,300 using the VCL for about 44,500 hours of use. (AC)

• **Upgrade of WolfPrint technology:** Developed and deployed a Samba-based replacement for the old accounted printing system used to provide the WolfPrint service for printing in computer labs and elsewhere on campus. (ISO and TSS)

• **Growth in wireless access:** 13 additional “mini-zones” were designed, and by June 2009, wireless access points will grow to almost 1,100 from approximately 950 last June. (ComTech)

• **iTunes@NC State expands:** Participation continues to increase with strong growth in content from colleges; OIT leads development and support. (OCC)

• **New Student and New Employee Orientation:** A host of activities and documentation introduced 5,000+ new students and their parents to OIT services and resources throughout the summer months. OIT led 44 New Employee Orientation sessions for 778 participants this year. (OCC, TSS and others)

### Research computing advances

• **High Performance Computing (HPC):** Students and researchers from 26 departments in six colleges used services during FY2008-2009. These researchers have more than $90 million dollars of currently active grants. Nearly 7 million processor hours of HPC services were used by more than 90 projects and 300 users compared to about 5.75 million processor hours used by about 270 users during FY2007-2008. (AC)

• **VCL code donation:** To foster a community of developers and accelerate development of VCL, NC State donated the VCL code to Apache Software Foundation in 2009. Extensive interest in VCL expressed by universities in several other states and countries. (AC)

### Highlights of other new and updated services and applications

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• **WolfWise:** The Implementation of the WolfWise calendaring and email environment for NC State was completed in summer 2009, with the next phase of customers scheduled for migration in June 2009. The project has involved many hours of effort, ranging from the technical complexities of migration requirements to campus decisions about email retention policy, end-user documentation, training, and Help Desk support. (ComTech, ISO, TSS, S&C, and OCC)

• **System Access Request (SAR):** Implemented new automated access control system to replace ASAP. (EAS, ISO, S&C, TSS, and OCC)

• **Budget Management System:** Rewritten in the Financial System. (EAS)

• **Wolfpack Reporting System:** Enhanced to include details on Pcard and MarketPlace transactions to aid in campus reconciliation efforts. (EAS and S&C)

• **Degree Audit Reporting System (DARS):** Components of infrastructure were architected and deployed to facilitate Community College Transfer Course Equivalency functionality migration from Mainframe into DARS. (ISO and EAS)

• **Faculty Event Management:** Implemented the module within the HR System. (EAS)

• **Summer school payrolls:** Standalone application implemented into monthly and biweekly payrolls. (EAS)

• **The MarketPlace:** Expanded the number of vendors supported, increasing the amount of spend driven to preferred vendors and using a lower-cost procurement path. (EAS)

• **New collaboration efforts with UNC-CH:** Related to enterprises applications. (EAS)

• **Expanded virtual server infrastructure:** Now hosting 350 virtual servers running Windows and Linux. Exploring virtualization options for other platforms. (ISO)

• **New Virtual Private Network (VPN):** Implemented Web-based SSL VPN solution. (ComTech)

• **IPTV:** Awarded RFP for IPTV to Video Furnace; residence hall pilot expected late fall 2009. (ComTech)

• **Life-cycle upgrades:** All network ports are now at least 100Mb/s. (ComTech)

• **iTRACS project:** Mapping of physical layer of network is approximately one-third complete with over 10,000 outlets verified and entered into the system. (ComTech)

• **Network ports:** Available ports increased from approximately 60,000 to over 62,000. (ComTech)

• **Launch of new OIT Web site:** To facilitate communication with campus and bring OIT services information into a new Drupal content management system. (all OIT units, led by OCC)

• **Enhanced communication efforts:** Expanded OIT news for campus and staff on Web and Twitter; launched new Web developers community on Ning and through regular meetings. (OCC)

**Changes in volume of IT security activities**

• **PCI DSS compliance:** Monthly monitoring of Payment Card Industry Data Security Standard (PCI DSS) compliance for credit card merchant accounts increased from 52 to 148. NC State now
required to certify Point of Sale-only merchant accounts in addition to those that use campus network and computing. (S&C)

- **Security incidents**: Computer misuse investigations increased, averaging 49 incidents per month. The number of incidents varied from 23 (up from 10) per month to a peak of 128 (up from 60). (S&C)

- **DMCA copyright infringement notifications**: Decreased to average of 80/month with a peak month of 202 (down from 250). Copyright infringement incidents in ResNet showed a 61% decrease from last year: 1,332 notifications in 07-08; 517 notifications in 08-09. (S&C, ISO and TSS)

- **Litigation hold requests**: Requests to preserve electronic copies of information and data for litigations represented by Legal Affairs increased from five to 20. This involved retention of related information including email and documents stored centrally, departmentally and on electronic media devices such as hard drives, USB, etc. (S&C, TSS, ISO, and ComTech)

**Lowering campus costs**

- **HPC Partners Program**: Faculty partners have purchased, typically with grant funding, most of the OIT HPC hardware. These resources are made available to other campus HPC users at no cost when the equipment is not being used by the faculty partner. (AC)

- **IP Telephony**: Significant progress in IPT deployment with over 5,000 lines transitioned to date allowing over $240,000 annually to be redirected to infrastructure projects. (ComTech)

- **Software licenses**: 10 Microsoft campus agreements consolidated into two agreements: Annual savings of ~$81,000; New Adobe Acrobat Term Site license saves campus ~$52,636, and licensed Toad Data Modeler (PowerDesigner replacement) saves OIT ~$25,950. Provided over 6,700 downloads of major software titles to faculty/staff/students, greatly reducing physical media and duplication costs. (S&C)

- **Learning space technologies**: Working with Purchasing and others, negotiated convenience contract for audio visual equipment for NC State and UNC that will save thousands of dollars. New in-house Crestron control system programming saved estimated $55,000 on fees in 2008-09 (TSS and OCC); design and integration services save NCSU over $100,000 annually. (OCC)

- **Computers**: “Apple bulk-buy” saved campus over $46,200 in spring 2009. (OCC)

- **Campus training**: Provided 108 free professional development opportunities with custom workshops, Lunch & Learn sessions, and new topics in faculty and staff training, with 1,268 participants. (OCC)

**COMPACT PLAN**

OIT has moved forward with numerous 2007-10 Compact Plan initiatives from the former central NC State administrative and academic IT organizations. Here are highlights of progress (the original Compact Plan initiative numbers are in parentheses):

- Surpassed baseline performance for data network backbone with 99.9999% availability. (1.2)

- Substantial progress related to IPT deployment. (1.7)
• Interacted with campus LAN Administrators formally and informally to exchange technical information. (2.1)

• Continued to actively engage the infrastructure subcommittee in prioritizing activities, specifically around prioritizing budget cuts. (2.6)

• Continued to engage IRC to set priorities for residence hall infrastructure enhancements. (2.7)

• Completed phases III (Records, Tuition Calc) and IV (Term end) of the Student Information System implementation. (2.C)

• Implemented eProcurement system. (2.E)

• Implemented interfaces necessary for State of NC new benefits system ORBIT. (2.F)

• Tape Backup and Storage Management Systems initiative continues as part of SOP Data Storage and Backup project. (B2)

• ClassTech classroom support and AVTech design and integration projects continue to save NC State over $100,000 annually while significantly enhancing learning environments for students and others. (A1)

• Continued Payment Card Industry - Data Security Standards (PCI DSS) compliance. (1.9)

DIVERSITY INITIATIVES

OIT provides IT Accessibility Services to NC State to support the university's commitment to equitable access to opportunities for students and employees with disabilities. This service focuses on proactive solutions for accessing the university's IT resources, including Web-based information and services. The former University Coordinator of IT Accessibility retired in December 2008, and the position remains vacant due to the state-wide hiring freeze. OIT continues to work with other campus units to provide IT accessibility assistance, although testing and advocacy efforts have been curtailed.

STAFF

MAJOR APPOINTMENTS

Dr. Marc Hoit joined NCSU as Vice Chancellor for Information Technology and head of OIT. John Black was named Director of Infrastructure, Systems and Operations.

PROFESSIONAL ACTIVITIES

Rick Brown was elected to the Board of Directors for the Association of Higher Education Cable Television Administrators (AHECTA); Mariela Montero served on the Board of Directors for the Compco Users Forum; Matt Valenzisi chaired the Architecture Subcommittee for the NCREN Network Services Operating Committee; Greg Sparks chaired NCREN’s Network Services Operating Committee. Mark Scheible chaired the Federated Identity Management Task Force/Working Group for K-20 access to university computing facilities at MCNC. Hal Meeks chairs the MCNC working group on Lecture Capture and is a member of North Carolina iTunesU interest Group. Dr. Eric Sills served on the organizing committee for the SC08 - international conference on high performance computing, networking, storage, and analysis. John Martin was a member of the 2008 People-to-People Technical
Communication Delegation that visited the People's Republic of China. Yessy Mendoza-Tate served as a member of the Oracle General Ledger Product Advisory Group.

Among the OIT staff who gave presentations or led sessions at major conferences: Susan Klein presented at the EDUCAUSE Mid-Atlantic Regional conference. Chris King presented a session at the national ACM/SGUCCS conference. The following OIT staff presented at the 2009 Oracle Alliance conference: Yessy Mendoza-Tate, Jack Forster, Tom Reynolds, Ginger McGlamery and Wade Davis. Jason Austin and Garrison Locke presented at the ZendCon 2008 conference. Stan North Martin co-led a Classroom Summit for UNC system schools. Mark Scheible presented twice to national Internet2 meetings about the university Identity and Access Management initiatives. Aaron Peeler, Dr. Sarah Stein, Dr. Henry Schaffer and Sam Averitt gave a day-long VCL seminar at the EDUCAUSE 2008 National Conference.

Many OCC staff gave presentations and led the planning for the state-wide UNC-CAUSE 2008 technical conference and the campus OIT EXPO 2008.

RECOGNITION

The HR Systems Team was awarded the Human Resources Red Ribbon award for their timely implementation of the state’s mandatory furlough.

Sundae Lewis of EAS and Noah Genzel of TSS were awarded the 2009 OIT Award for Excellence.

Nine OIT employees graduated from the Pathways Leadership Development Program: Jason Austin, Jennifer Riehle, Carol Hill, Ed Lee, Kristina Gasca, Mark Scheible, James Gardner, Venu Sanka and Eric Silberberg.

RECOMMENDATIONS AND CONCERNS FOR THE FUTURE

Doing more for more: The staff and leadership of all OIT units, like the university as a whole, are deeply concerned about the ongoing impact of the budget reductions for 2008-09 and those anticipated for the next fiscal year. Colleges and administrators are looking to OIT for strategic ways to meet the university’s targeted budget cuts. Their hope is that OIT can do more to help more of the university. Meanwhile, OIT had a permanent budget reduction of $178,741 this FY, with a one-time reversion of $1,170,099; 16 positions were abolished, including those of OIT 7 staff members who were let go - and with them many years of technical and institutional knowledge.

The budget cuts raise serious concerns about the availability of resources (people and hardware, etc.) for already planned implementations, upgrades and migrations. These include upcoming upgrades to critical administrative information systems such as the Student Information System, Human Resources, Financials, and the MyPack Portal as well as the new Financial Aid, Undergraduate Advising, Asset Management, Absence Management and data mart implementations. It has long been difficult to appropriately compensate staff with competitive salaries. Budget cuts and spending freezes are further impacting the ability to provide competitive salaries to retain and recruit the staff talent required to enhance and support the complex scope of OIT services. There is little operating budget flexibility and with additional cuts looming, there is the prospect that losing additional staff would jeopardize service delivery even more. Retention of highly qualified staff will be an increasing challenge, particularly when the IT job market picks up again. With the call to do more for more with less, it becomes increasingly important to recruit and retain top-notch talent.
**Regulatory and security compliance:** Resource constraints are expected to impact compliance issues ranging from the upcoming potential payments into the Universal Service Fund to ongoing IT security threats, IT accessibility compliance, peer-to-peer copyright infringement issues, litigation hold/eDiscovery requests, resilience, and IT audit demands. Web application security is becoming critical as attackers target more browser applications. Viruses and botnets are changing rapidly, and as a result, tools will be needed to detect or protect against them. Implementation of security awareness training is recommended for all university faculty and staff and particularly for IT developers of Web applications. Funding for training for technical staff as well as the general campus community is needed to implement new technologies and for existing systems. Critical staff and projects are being increasingly constrained by more aggressive schedules and numerous projects and initiatives while dealing with the integration of new security services requirements and increasing compliance workload.

**Technology leadership:** The move to IP telephony remains a priority due to the cost savings it will provide while offering greater flexibility in responding to customer demands for services and functionality. Campus cable television infrastructure is becoming dated, requiring a significant upgrade in the next year. The upgrade of the campus network backbone has been moved from 2010 to 2011 so as to be on the leading edge of a new line of network technology instead of trailing edge of a legacy product. Leading technologies such as high performance computing and the Virtual Computing Lab continue to operate with insufficient funding and staff.

OIT remains committed to NC State’s status as North Carolina’s flagship institution in science and technology. Even in the face of budget challenges, the university’s leadership and management will need to maintain commitments to sufficient resources for priority ICT projects. They will need to maintain their engagement in the evolution of technology, enterprise systems, and the needs and expectations of students, faculty and researchers.