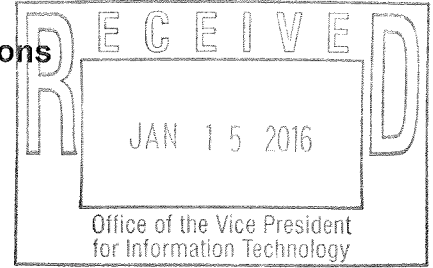# NDSU Technology Action Plan Request

#1609

I. Action Plan Introduction and Authorizations

NDSU ORGANIZATION OR UNIT
Electrical and Computer Engineering

TITLE OF PROJECT
Remote Student Access to ECE Software

Project Duration (3 years maximum)	From: 2/1/2016		To: 12/31/2016
Type of Project (Check one)	New X	Previously Submitted	Renewal

Total Technology Fee Request: $20,243.50

Project Directors (Must be NDSU faculty or staff)	Campus Address: Electrical Engineering 241
Eric Christianson Scott C. Smith	Phone: 701-231-7364; 701-231-7608 Fax: 701-231-86778 E-mail: eric.s.christianson@ndsu.edu; scott.smith.1@ndsu.edu

Name (Type or Print)	Signature	Date
Project Director Eric Christianson		1/15/16
Unit Head Scott C. Smith		1/15/16
IT Division Consultant Jason Eide		1/15/16

Executive Summary (maximum of 175 words)

This project requests the purchase of a server and security software that will provide the 500+ Electrical and Computer Engineering (ECE) students with the ability to securely remote access the numerous and varied licensed software applications required for the multitude of courses taught by the ECE department. Currently, ECE students must physically access the computers in the ECE computer cluster, ECE room 121, in order to utilize the ECE software required for their courses. This is far below par compared with our peer research institutions, most of which have had remote ECE software access for their students for many years. Note that this comparative data is from the ECE Department Chair's work/schooling at 4 other research universities and his current position as Vice President of the Central States ECE Department Heads Association where these types of issues are discussed. This project will provide a major benefit to ECE students in terms of software availability and flexibility in completing their coursework.

We will only accept for consideration Technology Action Plan Request forms which are fully completed and signed according to the guidelines listed in the Instructions, pages 1 and 2.

Technology Action Plan Request forms will be opened and reviewed after the submission deadline.

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NDSU Technology Action Plan Request

II. Project Overview

1. How does this project meet student needs?

Currently, ECE students must physically access the computers in the ECE computer cluster, ECE room 121, in order to utilize the ECE software required for the vast majority of their ECE courses. This project would allow students to complete their classwork remotely, such as from their dorm room or an off-campus apartment, instead of having to be physically present in the ECE building to do this work, which is a standard capability at our peer institutions.

2. What audience does this project directly serve? What audience is indirectly served? How many students are affected?

This project would allow remote access to all 500+ ECE students. ECE faculty would also be able to utilize the proposed remote access capability to enable them to prepare materials for their classes in the evenings from the comfort of their own homes.

3. For projects that target a subset of NDSU's students, please describe the possibility for broader application in the future.

This project would serve as an excellent pilot to demonstrate how remote computer access can be securely provided to students, which is vital at a research university, especially for technical majors, such as engineering. The ECE department would be happy to share the results of this project with other departments, so that they could follow suit, as well as with campus IT, if they were interested in rolling out a centralized system.

4. Describe both the immediate and long term impact of this project.

The capability of ECE students being able to use the ECE software from a remote location is expected to immediately result in increased assignment completion and student grades, since students will be able to work in the evenings from the comfort of their own homes, rather than having to venture out, especially in the cold months, to the ECE department to complete their coursework. Longer term, this is expected to increase ECE student retention and graduation rates.

5. Who will pay for ongoing expenses following the technology fee funded portion of this project (e.g., who will replace hardware or software after it has reached its end of life)?

The ECE department will maintain this system after its initial deployment, utilizing the department's differential tuition funds.

6. Describe how this project will follow NDSU's best practices in information technology. (Please make sure the NDSU IT Division staff you consulted signs in Part I of this form.)

The project will utilize authentication software, such as Duo's two-factor authentication, such that remote access to the system is secure. The system will be installed and maintained by ECE's full-time IT System Administrator, Eric Christianson.

7. What service on campus is most similar to the one proposed here? How does this project differ?

There is currently no system on campus that will allow ECE students to remotely access the ECE software needed for their ECE courses. They can only access the needed software when physically in the ECE building's computer lab. I am not aware of any such remote access system in other departments; this definitely doesn't exist in any of the College of Engineering departments, where it is very much needed.

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NDSU Technology Action Plan Request

III. Project Description (5 pages maximum)

Include information on the background of this project: how did it come to fruition?

The basis for this project comes from the need to provide students with an alternative to being physically present in the ECE building in order to be able to utilize the ECE software necessary to complete their ECE class assignments. The current situation is far below par compared to our peer research institutions, who have had remote access capability for their students for the past 20+ years.

ECE's current Department Chair, Dr. Scott C. Smith, who is a co-director for this project, came to NDSU in summer of 2013, and found the state of computing resources in the College of Engineering (CoE) to be far below par compared to the previous 4 universities that he was affiliated with: University of Missouri – Columbia as an undergrad (1992 – 1996) and MS student (1996 – 1998), University of Central Florida as a PhD student (1998 – 2001), University of Missouri – Rolla (now called Missouri University of Science & Technology) as an Assistant then Associate Professor (2001 – 2007), and University of Arkansas as an Associate Professor (2007 – 2013) and Interim Associate Department Head (2009 – 2011). Most significantly, 1) the NDSU library did not have a license for the full IEEE database of journal and conference articles that is imperative for ECE researchers (grad students and faculty) to be able to access cutting edge research in the field and write competitive external grant proposals and research articles, 2) there were only 2 full-time IT staff for the entire CoE, which is woefully inadequate to address all of the computing needs for the college in a timely manner, and 3) there was no remote access capability for any of the CoE software, such that students and faculty had to be physically present in a CoE lab in order to utilize the software necessary for their coursework and research. Shortly after becoming Department Chair, Dr. Smith attended the Central States ECE Department Heads Association (CSECEDHA) meeting, where he met with all of the other ECE Department Chairs in the Central States Region (i.e., Arkansas, Iowa, Kansas, Missouri, Nebraska, North Dakota, Oklahoma, and South Dakota) to discuss various department chair/head related issues. When Dr. Smith mentioned NDSU's computing issues, listed above, the other department chairs in attendance were astonished, and all confirmed that these resources existed at their university, which affirmed Dr. Smith's belief that NDSU's CoE computing resources were far below par compared to our peer institutions.

Dr. Smith then began working to improve these 3 main issues: 1) he worked with the NDSU library to get them to purchase the full IEEE database collection, which was done in 2014, such that now all NDSU students and employees have online access to all IEEE journal and conference articles in the database; 2) he convinced the CoE Dean to allow him to hire a full-time IT professional dedicated to the ECE department, Eric Christianson, whom started in Oct. 2015, such that now there is an adequate level of computing support in the department, so all computing issues are now being dealt with in a timely manner, and much needed computing upgrades, such as adding remote access capability, can be pursued; and 3) this proposal is requesting the hardware and software resources needed to enable remote access capability for the 500+ ECE students, which after implementation, will place the NDSU ECE department on par with our peer research institutions in terms of computing resources/capability.

The specifics of this request include a Remote Access Server and 50 Client Access Licenses, which will allow up to 50 users to remotely access the system at the same time to utilize various ECE software applications from their dorm room or an off-campus apartment, instead of having to be

physically present in the ECE building to do this work. The system will also allow undergrad and grad researchers and faculty to work on their research over the summer, even if they are not physically present in Fargo. The remote access capability will be done in a secure manner. The preferred method is to utilize Duo's two-factor authentication security software: https://duo.com/. NDSU IT is meeting with NDUS IT on January 20, 2016, to discuss the potential availability of a system-wide Duo license in the near future. If a system-wide license is not purchased, we will need to utilize a different security approach, such as creating a firewall around the remote access server and then requiring users to first login to a Virtual Private Network (VPN) before being able to login to the remote server, since the cost of the Duo software, over $1,500 per month, is unrealistic in order for this project to be sustainable in the long run. Note that ECE will pay for the cost of the firewall and VPN, from the department's differential tuition budget, if a system-wide Duo license is not available. The remote access system will be installed and maintained by ECE's full-time IT System Administrator, Eric Christianson; and ECE will pay for any future maintenance costs and software upgrades for the system from the department's differential tuition budget.

Dr. Smith was in charge of ECE software at his previous two institutions, so is very familiar with the license agreements for most of the ECE software packages utilized at NDSU, and is confident that these software packages can be utilized remotely, as long as they are only accessible to NDSU students and employees through a secure interface. Additionally, remote access of ECE software is commonplace at our peer institutions, as previously mentioned. However, Eric Christianson and Dr. Smith will review the license agreement for all ECE software packages before making them available for remote access on the server, in order to ensure that the terms of any license agreements are not violated.

To summarize, this project would allow all 500+ ECE students to complete their classwork remotely, such as from their dorm room or an off-campus apartment, instead of having to be physically present in the ECE building to do this work, which is a standard capability at our peer institutions. This is expected to immediately result in increased assignment completion and student grades, since students will be able to work in the evenings from the comfort of their own homes, rather than having to venture out, especially in the cold months, to the ECE department to complete their coursework. Longer term, this is expected to increase ECE student retention and graduation rates. Furthermore, this project would serve as an excellent pilot to demonstrate how remote computer access can be securely provided to students, which is vital at a research university, especially for technical majors, such as engineering. The ECE department would be happy to share the results of this project with other departments, so that they could follow suit, as well as with campus IT, if they were interested in rolling out a centralized system.

NDSU Technology Action Plan Request

IV. Milestones

List the date for each project milestone. These milestones should represent the *significant* accomplishments that will be associated with the action plan. For each milestone, please indicate its expected outcome and the means for assessing that outcome. (The table may be extended as needed.)

	Date	Milestone	Expected Outcomes	Means of Assessment
1.	2/1/16 – 5/14/16	purchase server and security software	server and security software have been purchased	purchased server and security software at NDSU and ready to install
2.	5/15/16 – 7/14/16	install server and software	server and software have been installed	system installed and ready for testing
3.	7/14/16 – 8/14/16	test system with faculty and grad students working over summer	system completely functional by end of summer	student and faculty test subjects are able to securely remote login to the server from off campus and utilize the various ECE software packages
4.	8/15/16 – 8/22/16	rollout system for access by all NDSU ECE students and faculty; and notify the students and faculty about the new system and how to access it	system fully operational and available to all NDSU ECE students and faculty by the beginning of Fall Semester 2016	all NDSU ECE students and faculty are able to securely remote login to the server from off campus and utilize the various ECE software packages
5.	8/23/16 – 12/31/16	system utilized by NDSU ECE students	students utilizing new system to remotely do their ECE coursework	review server logs to see how many ECE students are utilizing the system

NDSU Technology Action Plan Request

V. Supporting Documentation

Print Summary

Precision Rack 7000 Series (7910)

Starting Price	$29,291.34
Instant Savings	$7,322.83
Subtotal	$21,968.51

As low as $660.00 /month^

Dell Business Credit | Apply

Discount Details

Ships in 4 - 6 Business Days

My Selections **All Options**

○ Precision Rack 7000 Series (7910)

Date	1/7/2016 4:26:42 PM Central Standard Time
Catalog Number	4 Retail 04
Evalue Code	CUPR7910W7P

Catalog Number / Description	Product Code	Qty	SKU	Id
Dell Precision Rack 7910: Dell Precision Rack 7910 XCTO Base	R791CT	1	[210-ACYX]	1
Operating System: No Operating System Selected	NOOS	1	[634-BCRM]	11
Processor: Dual Intel® Xeon® Processor E5-2695 v3 (14C, 2.3GHz, 35M, 120W)	252695	1	[338-BFDK][412-AAED]	146
Office Productivity Software: No Productivity Software	NOPSW	1	[817-BBBC]	1002
Non-Microsoft Application Software: Dell Applications for N-Series	APPNS	1	[370-AAIP][444-BBBG][658-BBII]	1003
Video Card: Graphics not included	NVC	1	[490-BBLF]	6
E-Star : No Estar	NOESTAR	1	[387-BBCE]	122
Chassis Options : Dell Precision Rack 7910 Chassis	CHAS2U	1	[329-BCHZ][329-BCIB]	116
Memory: 256GB (16x16GB) 2133MHz DDR4 ECC RDIMM	256G16	1	[370-ABWC]	3
HDD/Storage Controller: Mini PERC 9 H730P HW RAID Card 12Gb/s SAS /SATA(6.0Gb/s) RAID 0/1/5/10	H730P	1	[403-BBHI]	9
Internal Hard Drive Configuration: C1 SATA/SSD 2.5", 1-8 Hard Drives	C1	1	[405-AAGC]	276

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Raid configuration Connectivity : RAID 5	RAID5	1	[780-BBCM]	1009
Hard Drive: 500GB 2.5" Serial-ATA (7,200 RPM) Hard Drive	500GAS	1	[400-AFFK]	8
2nd Hard Drive: 500GB 2.5" Serial-ATA (7,200 RPM) Hard Drive	500A	1	[401-AAMN]	637
3rd Hard Drive: 500GB 2.5" Serial-ATA (7,200 RPM) Hard Drive	500A	1	[401-AAMN]	54
4th Hard Drive: 500GB 2.5" Serial-ATA (7,200 RPM) Hard Drive	500A	1	[401-AAMN]	51
5th Hard Drive: 500GB 2.5" Serial-ATA (7,200 RPM) Hard Drive	500A	1	[401-AAMN]	52
6th Hard Drive: 500GB 2.5" Serial-ATA (7,200 RPM) Hard Drive	500A	1	[401-AAMN]	53
7th Hard Drive: 500GB 2.5" Serial-ATA (7,200 RPM) Hard Drive	500A	1	[401-AAMN]	71
8th Hard Drive: 500GB 2.5" Serial-ATA (7,200 RPM) Hard Drive	500A	1	[401-AAMN]	72
Storage Volume: Boot drive or boot volume is greater than 2 TB (select when 3TB/4TB HDD is ordered)	GPT3TB	1	[411-XXYB]	387
CD ROM/DVD ROM : DVD ROM, SATA, INTERNAL	DVDPLS	1	[429-AATR]	16
Optical Software: PowerDVD Software not included	NOPDVD	1	[429-AABU]	597
Network Card : Intel I350 (4x1Gbit) Quad Port Network Card	NTWK	1	[540-BBIR]	13
Teradici Remote Workstation Access Host Card: No Remote Access Host Card	NHSTCRD	1	[340-ADBJ]	959
Dell Data Protection |Encryption Security SW: No DDPE Encryption Software	NODDPE	1	[954-3465]	156
Protect your PC: No Security Software	NOSECSW	1	[817-BBBC]	1014
Keyboard: No Keyboard	NKB	1	[580-ABIS]	4
Mouse: No Mouse	NMSE	1	[570-AADK]	12
Stands: No Stand	NOSTND	1	[575-BBCH]	558
Adapters: DP to VGA Dongle	DP2VGA	1	[492-BBFP]	592
OS Recovery: OS-Windows Media Not Included	NOMEDIA	1	[620-AALW]	200013
Dell backup recovery: No DBAR	NODBAR	1	[637-AAAM]	200076
Resource DVD: Dell Precision Rack 7910 Resource DVD	RDVD	1	[430-XYJP]	50
Quick Reference Guide: Precision Workstation Rack 7910	PLCMT	1	[340-AMMC]	60
Power Cords: US 120V Power Cord (quantity 2)	PUTPG2	1	[450-AAHH][450-AAHH]	20

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http://configure.us.dell.com/dellstore/print_summary_details_popup.aspx?~lt=print&c=us&...   1/7/2016

Rack Mounting Rails: ReadyRails Sliding Rails With Cable Management Arm	RCKRL	1	[770-BBMN]	88
Regulatory Label: Rack 7910 Regulatory Label (DAO)	REGLBL	1	[389-BEUT]	676
Front Bezel: Bezel	BEZEL	1	[350-BBFK]	669
Power Supply: Dual, Hot-plug, Redundant Power Supply (1+1), 1100W	1100R	1	[450-AEHN]	1015
Riser Card: Left Riser (Riser 3) with 2 PCI-e x16 wired as x8 single width slots	RSRLFT	1	[330-BBDZ]	270
Shipping: Shipping Material	SHIP	1	[328-BBZI][340-AEYP]	465
TPM Security: TPM	TPM	1	[328-BBZM][329-BBJL]	297
Canada Ship Options: Non-Canada orders only	USNONE	1	[332-1286]	111
Memory Configuration Type: 8 Memory Fillers for Dual CPU	FILL8D	1	[370-ABXN]	1562
Virtualization GPUs: Dual NVIDIA® GRID K2A 8GB	K2D	1	[490-BBYR]	215
Embedded Systems Management (Multi): iDRAC8 Express, integrated Dell Remote Access Controller, Express	DRACEX	1	[385-BBIQ]	1520
Hardware Support Services: 3 Years ProSupport with Next Business Day Onsite Service	PN3	1	[989-3449][997-5852][997-5877][997-5893]	29
Documentation/Disks: Safety/Environment and Regulatory Guide (English/French Multi-language)	EFDOC	1	[340-AGIK]	21

Print

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NDSU Technology Fee Action Plan Request
VI. Budget
(double-click on the form to begin entering data)

1.	NDSU ORGANIZATION OR UNIT
	Electrical and Computer Engineering

2.	PROJECT DIRECTOR(S)
	(Must be NDSU faculty or staff)
	Eric Christianson and Scott C. Smith

3.	SALARIES AND WAGES			
	Personnel description	Number employed	Number of months	Funds Requested
	A. Staff			
	B. Graduate students			
	C. Undergraduate students			
4.	TOTAL SALARIES AND WAGES			$0.00
5.	FRINGE BENEFITS			
6.	TOTAL SALARY, WAGES AND BENEFITS			$0.00

7.	EQUIPMENT	
	A. Remote Access Server (Dell Precision Rack 7000)	19,238.00
	B.	
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
8.	TOTAL EQUIPMENT	$19,238.00

9.	MATERIALS AND SUPPLIES	
	A. Client Access Licenses to support 50 simultaneous users	$959.50
	B. Server Cable for integration with ECE's existing server rack and console	$46.00
	C.	
	D.	
	E.	
	F.	
	G.	
	H.	
10.	TOTAL MATERIALS AND SUPPLIES	$1,005.50

11.	TOTAL TECHNOLOGY FEE REQUEST	$20,243.50

12.	MATCH (Describe in Match Section)	

13.	TOTAL PROJECT EXPENDITURE	$20,243.50

NDSU Technology Action Plan Request

VII. Budget Justification

The requested budget consists solely of the computer hardware (Remote Access Server and Server Cable) and security software (Client Access Licenses) needed to implement the remote access system. Note that the initial quote for the server, included in the Supporting Documentation section to show the server configuration, is for $21,968.51; however, it'll only cost us $19,238 when ordering it from the bookstore. Each Client Access License is $19.19 for a perpetual license. We plan to purchase 50 of these, which will allow up to 50 users to remotely access the system at the same time. Hence, approximately 10% of ECE students will be able to remotely access the system simultaneously. This should be sufficient; however, if student demand exceeds this, we will purchase additional Client Access Licenses from the ECE Department's differential tuition budget, and will explore additional funding opportunities for a second server, if needed. The labor for installing, testing, and maintaining the system will be done by ECE's full-time IT System Administrator, Eric Christianson, and therefore will be paid by the ECE Department. Additionally, ECE will also pay for any future maintenance costs and software upgrades for the system, from the department's differential tuition budget.

VIII. Budget Match

1. Attempted Budget Matches:

2. Actual Budget Matches:

The labor for installing, testing, and maintaining the system will be done by ECE's full-time IT System Administrator, Eric Christianson, and therefore will be paid by the ECE Department. Additionally, ECE will also pay for any future maintenance costs and software upgrades for the system, from the department's differential tuition budget.

3. Additional Budget Match information:

As explained in the Project Description section, in case there is not a university system-wide license available for the Duo two-factor authentication security software, the cost of this software, over $1,500 per month, is unrealistic in order for this project to be sustainable in the long run. Hence, in this case, alternative security measures will be utilized, such as creating a firewall around the remote access server and then requiring users to first login to a Virtual Private Network (VPN) before being able to login to the remote server. In this case, ECE will pay for the cost of the firewall and VPN, from the department's differential tuition budget.