2011 SENATE APPROPRIATIONS

SCR 4003

2011 SENATE STANDING COMMITTEE MINUTES

Senate Appropriations Committee
Harvest Room, State Capitol

SCR 4003
January 20, 2011
13160

☐ Conference Committee

Committee Clerk Signature Rose Laning

Explanation or reason for introduction of bill/resolution:

A concurrent resolution supporting the Northern Tier Network Technology Initiative.

Minutes: See attached testimony - #1 – 2.

Chairman Holmberg called the committee hearing to order on SCR 4003.

Roxanne Woeste – Legislative Council; Sheila Peterson – OMB

Senator Grindberg, State Senator, District 41, Fargo
Interim Workforce Committee Chairman

Senator Grindberg stated that the Interim Workforce Committee passed this resolution and shared some of the logic of the committee. As chairman of the interim committee, the study assignments were to study best practices technology based economic development, the role of the Commerce Dept. in interaction with local economic development organizations, as well as continuing to look at policy and approaches to make sure NDs position for a global marketplace where industry and business can flourish and partner, and invest and create jobs, etc.

He recalled some of the strategies and the efforts that went on in the 1990s when we had an abundant labor supply. The strategy in ND was to sell cheap labor. When he worked in an economic development corporation, his job was to travel around the country and market college graduates for $7.50/hr if you moved to ND with your company. That no longer is the case.

The economic development community has been moving in a direction of a more technology based approach and has more support for entrepreneurship. From a website called the State Science & Technology Institute which is housed in Ohio, and it's a Best Practice think tank for economic development practice, he shared some of the strategies in a technology based economy. Areas of importance are: investment to intellectual infrastructure, universities and public private research laboratories that generate new knowledge and discoveries; mechanisms for transferring that knowledge from one

individual to another or from one company to another; physical infrastructure that includes high quality telecommunications systems and affordable high speed internet; a highly skilled and technical workforce; and sources to risk capital for entrepreneurship in business development.

The bill drafts that came out of the workforce committee are directed towards the technology based economic development theme. The Northern Tier Network is part of a broader strategy of connectivity and tying ideas to strengthen what we're doing in this state and take it to the next level.

Senator Christmann: Do those other bills all have appropriations tied to them? And thus this ends up in appropriations – is there something here tied to an appropriation?

Senator Grindberg: I'm not aware of an appropriation tie to this. Why it's here, you've got me.

Randall Thursby, CIO, North Dakota University System
Testified in favor of SCR 4003.
He stated that the NDUS supports the resolution and introduced **Marc Wallman** .

Marc Wallman, Assistant VP for Enterprise Computing and Infrastructure, NDSU
Written testimony attached - # 1. Testified in favor of SCR 4003.
Northern Tier Network 07-09 Biennial Report – Testimony attached - # 2

Reading from his testimony, he gave an update of the Northern Tier Network – North Dakota (NTN-ND).

Senator Christmann: I appreciate your comments saying you had no intention of competing with private industry. In looking at the resolution, in the first 'whereas', it kind of gives a definition of Northern Tier. Would you be comfortable if we added some of the language from century code that states that it's only for the purposes supporting the research and education missions of the NDUS?

Randall Thursby: We would have no objection with that. That's our stance, that we are providing it beyond the research and educational purposes. I have no concern with that from the University System perspective.

Senator Christmann: Is the link finished now and being used from Winnipeg to Grand Forks? I thought that was still in the planning stage.

Randall Thursby: That link is not complete and still in the planning stage. We hope at some point that will be completed because it is important for linking the University of North Dakota with another route out. Right now, the funding is not there for that either on the Canadian side or the US side.

Marc Wallman – We have talked about collaborations between the University Medical School and Winnipeg also.

Senator Wardner: When it comes to STAGEnet, is Fargo the only place they can interact with NTN? In other words, if a school district in the middle of ND or the NW part is receiving a program from outside the state, or wants to send information, can they get on in Dickinson or Bismarck or Grand Forks, or does it have to go to Fargo on STAGEnet?

Randall Thursby said K-12 couldn't unless it was Internet 2 services. That would STAGEnet to the connect point and the only connect points right now are at Grand Forks and Fargo.

Marc Wallman said NTN only connects to Internet 2. It does not connect to any general internet sites such as Google, Yahoo or CNN. Any K-12 institution in the state who wants to access internet 2 sites does so via STAGEnet. At NDSU, we can only access this through STAGEnet. At NDSU, we had to contract with Idea One in Fargo to improve our local connectivity so we could connect to the NTN. So our NTN goes through STAGEnet. Any school would be in a similar situation and the same with Valley City, Williston or Minot.

Senator Wardner: Any school in the state, including the two universities, have to use STAGEnet to get onto Northern Tier Network? The answer was yes.

Senator Bowman asked about this being 178,000 times faster than dial-up? What does this mean? What are we getting out of this for the investment that is being made?

Randall Thursby said the connection is 178,000 times faster and delivers information much faster. He went on to explain the progression of bandwidth usage from texting to sending pictures, then elaborate graphics and high resolution pictures, then video, and then high definition video. Now sites have animations, videos, whether it's education or commercial. They all take tremendous more bandwidth. When you get into research, it requires much higher capacity in order to exchange data and do research on a live basis. Researchers may be connecting in a way that they may be sitting at the University of MN and the UND and collaborating on a grant. They have to be looking live. As one changes something, the other one has to see it. That requires capacity.

Chairman Holmberg said there are some federal agencies and some grants that require you to have this bandwidth, otherwise you're not eligible to apply for those federal grants.

Robert Kelley, President, University of North Dakota
Testified in favor of SB 4003. No written testimony.

He simply stated that the access to the high speed network, the Northern Tier backbone is completely fundamental to the work of the University of North Dakota, as one of the two research universities here in our state. I could give you all kinds of examples and cite you data, but will leave you with one thought. What is of interest to the computational scientists at these research universities is the size of the pipe through which the information travels. It's also an issue that we have come to the point of much of our computational science where we load information into massive computers and send that information in HUGE data sets, depending upon the work, to other computers. Those computers don't sleep and the quicker that we can transfer that information essentially from an analytical center to another analytical center, the fast the work can go forward. I would also underscore the comment

that was made by the chairman of the committee is that we have many large federal development grants and interaction grants that do require the universities to have access to high speed networks like Northern Tier. I would be happy to put the shoulder behind the Northern Tier resolution from the University of North Dakota and respond to any questions.

Senator Christmann: In your interactions that I expect happened with South Dakota Universities, have we kind of shut the door on them and left them in the dark on this deal or how are they doing? They seem to be missed here.

President Kelley: My understanding is that we are very much engaged in ongoing conversations with the universities in South Dakota and that the Northern Tier piece is as critical to them as it is to our research efforts here in the universities in North Dakota. I do believe there are some grants going forward that require the collaboration between these universities that will be benefitted by the high speed network.

Chairman Holmberg any other testimony? Closed the hearing on SCR 4003.

2011 SENATE STANDING COMMITTEE MINUTES

Senate Appropriations Committee
Harvest Room, State Capitol

SCR 4003
February 9, 2011
Job # 14253 (Meter 17:05)

☐ Conference Committee

Committee Clerk Signature Lori Laning

Explanation or reason for introduction of bill/resolution:

A vote on SCR 4003.

Minutes: You may make reference to "attached testimony."

Chairman Holmberg said this was a resolution saying that the legislature supports the ideas embodied in the Northern Tier Network. It is a high speed research and education interface that goes across the northern part of the country. This goes down around Chicago and to Omaha, NE and across to Seattle, WA. We are a part of a northern route across the country.

It is not a bill but a resolution that says the legislature supports the Northern Tier Network technology initiative and related activities of the interim information technology committee. Then we send this resolution to the various folks involved.

Senator Wardner commented to visiting students that this network goes right through Dickinson. AT&T has donated fiber for the Northern Tier Network and Dickinson State University with the Teddy Roosevelt Institute will be hooked up to the network to bring the information to them.

Senator Christmann suggested an amendment that would clarify the language from the Century Code. The amendment number is 11.3024.02001 and he Moved Do Pass.

Senator Grindberg seconded.

A Roll Call vote was taken. Yea: 13 Nay: 0 Absent: 0

Senator Grindberg moved Do Pass as Amended.
Senator Christmann seconded.

A Roll Call vote was taken. Yea: 13 Nay: 0 Absent: 0

Senator Grindberg will carry the bill.

2011 SENATE STANDING COMMITTEE MINUTES

Senate Appropriations Committee
Harvest Room, State Capitol

SCR 4003
03-31-2011
Job # 16206

☐ Conference Committee

Committee Clerk Signature Alice Delzer

Explanation or reason for introduction of bill/resolution:

DISCUSSION ON THE NORTHERN TIER NETWORK (CONCUR) Several other bills were discussed on this job – SB 2210, SB 2018 and HB 1266.

Minutes: You may make reference to "attached testimony."

Chairman Holmberg opened the discussion on SCR 4003. Lori Laschkewitsch, OMB and Becky J. Keller, Legislative Council were also present.

Chairman Holmberg asked what the wishes are concerning SCR 4003. They said they would CONCUR on SCR 4003.

The discussion was closed on SCR 4003.

11.3024.02001
Title.

Prepared by the Legislative Council staff for
Senator Christmann
January 20, 2011

PROPOSED AMENDMENTS TO SENATE CONCURRENT RESOLUTION NO. 4003

Page 1, line 4, after "network" insert "for the purpose of supporting the research and education missions of the North Dakota University System"

Renumber accordingly

Date: 2-9-11
Roll Call Vote # 1

2011 SENATE STANDING COMMITTEE ROLL CALL VOTES
BILL/RESOLUTION NO. 4003

Senate Appropriation Committee

☐ Check here for Conference Committee

Legislative Council Amendment Number 11.3024.02001

Action Taken: ☒ Do Pass ☐ Do Not Pass ☐ Amended ☒ Adopt Amendment

☐ Rerefer to Appropriations ☐ Reconsider

Motion Made By Sen Christmann Seconded By Sen. Grindberg

Senators	Yes	No	Senators	Yes	No
Chairman Holmberg	✓		**Senator Warner**	✓	
Senator Bowman	✓		**Senator O'Connell**	✓	
Senator Grindberg	✓		**Senator Robinson**	✓	
Senator Christmann	✓				
Senator Wardner	✓				
Senator Kilzer	✓				
Senator Fischer	✓				
Senator Krebsbach	✓				
Senator Erbele	✓				
Senator Wanzek	✓				

Total (Yes) 13 No 0

Absent 0

Floor Assignment _____

If the vote is on an amendment, briefly indicate intent:

Date: 2-9-11
Roll Call Vote # 2

2011 SENATE STANDING COMMITTEE ROLL CALL VOTES
BILL/RESOLUTION NO. 4003

Senate Appropriations Committee

☐ Check here for Conference Committee

Legislative Council Amendment Number _____

Action Taken: ☒ Do Pass ☐ Do Not Pass ☒ Amended ☐ Adopt Amendment

☐ Rerefer to Appropriations ☐ Reconsider

Motion Made By Grindberg Seconded By Christmann

Senators	Yes	No	Senators	Yes	No
Chairman Holmberg	✓		Senator Warner	✓	
Senator Bowman	✓		Senator O'Connell	✓	
Senator Grindberg	✓		Senator Robinson	✓	
Senator Christmann	✓				
Senator Wardner	✓				
Senator Kilzer	✓				
Senator Fischer	✓				
Senator Krebsbach	✓				
Senator Erbele	✓				
Senator Wanzek	✓				

Total (Yes) 13 No 0

Absent 0

Floor Assignment Sen. Grindberg

If the vote is on an amendment, briefly indicate intent:

2011 HOUSE GOVERNMENT AND VETERANS AFFAIRS

SCR 4003

2011 HOUSE STANDING COMMITTEE MINUTES

House Government and Veterans Affairs Committee
Fort Union Room, State Capitol

SCR 4003
March 17, 2011
15636

☐ Conference Committee

Committee Clerk Signature Carmen Hart

Explanation or reason for introduction of bill/resolution:

Supporting the Northern Tier Network Technology

Minutes:

Chairman Bette Grande opened the hearing on SCR 4003.

Jennifer Clark, Legislative Council, appeared. This resolution came from the interim workforce committee. It is recognizing and supporting the northern tier network technology initiative. The reason the interim committee pursued this legislation is that we had several studies dealing with workforce and the role of higher education in workforce. The committee considered infrastructure and acts that can be taken to improve the dynamics relating to workforce in higher education and we recognized the activities of the northern tier technology initiative. I noticed that in the first house they did make one small amendment on Page 1, Lines 4-5. They added for the purpose of supporting the research and education missions of the North Dakota university system.

Chairman Bette Grande: With the wording there North Dakota university systems from Seattle, Washington to Chicago, Illinois so the university systems through that area? Shouldn't there be a comma or something in here?

Jennifer Clark: I wasn't involved in putting together that amendment. I assume what they are talking about is the network from Seattle to Chicago through Manitoba, through Nebraska. I would leave it to committee if they think there is a need to change the grammar on that. I can tell you what I think their intent was.

Chairman Bette Grande: That would help me.

Jennifer Clark: My understanding is that network supports that communication through all those different states and provinces.

Chairman Bette Grande: What does that have to do with the university system?

Jennifer Clark: They are a component of that as higher education working with this network.

Chairman Bette Grande: I still don't think the wording makes sense at all.

Jennifer Clark: I don't have any disagreement with that. It might be valuable to rephrase that.

Marc Wallman, Assistant Vice President, Enterprise Computing and Infrastructure, North Dakota State University, appeared. **Attachment 1.** When he got to the paragraph on Page 2 of testimony about the research activities, he mentioned that when this testimony was presented to the senate, they had representatives from UND to give a few words about how this affects their research activities. I know that they are interested in partnering with Manitoba. They have a medical school up there for medical activities. The northern tier network has also been of interest to weather researchers.

Rep. Roscoe Streyle: How many of the dark fiber strands are being used right now?

Marc Wallman: There are two strands going east/west. One is used in production and the other is in case there needs to be maintenance. There are two strands north/south.

Rep. Roscoe Streyle: There isn't six total? Only research data and education data is allowed to be sent over these lines right now. What is the university's thoughts on if we get the new IT center and creating a disaster recovery site in Bismarck and allowing just backup data to flow?

Marc Wallman: I think that probably is a question better answered by Lisa Feldner. I don't see her here today. That doesn't sound necessarily like a bad idea but I think right now that may be prohibited by the century code.

Rep. Roscoe Streyle: I think it is.

Rep. Bill Amerman: In the first resolve it says the 62nd legislative assembly supports the northern tier network technology. In your estimate what does that mean by support?

Marc Wallman: I wasn't involved in the creation of that language at all. I am not sure what the intent is. I don't know that there is any action associated with the resolution or anything. There is not a separate funding request coming to legislature. It is part of the overall university system appropriation as I mentioned in my testimony. My guess is that the intent was just to acknowledge this as a part of our existing appropriation request. It was funded separately in the past.

Rep. Lonny Winrich: I was a member of the interim IT committee and I remember Bonnie Neas' report that you referenced. Have we made any progress toward funding the link between Grand Forks and Winnipeg?

Marc Wallman: We have not. We have been in discussions on and off with Canada. Their national network is called canary. Interest has kind of ebbed and waned depending on the economic situation. The people in Manitoba are more interested than the national people are from my understanding. We expect to kind of keep going and continue conversations and when there looks like there is a good opportunity to be able to find

funding for that I think we will proceed. Our research has been greater than those in Canada.

Rep. Karen Karls: You mention in your testimony on Page 3, North Dakota telecommunications companies have played and will continue to play a vital role. Can you tell us are there many of them? Do they have names?

Marc Wallman: All institutions in state higher ed. can access the northern tier network but they access it through STAGEnet at the state network. That is actually provided by North Dakota telecommunications providers. The state backbone is primarily provided by Dakota Carrier Network. There are many local providers that provide connectivity. The connectivity in Fargo that I mentioned locally that gets NDSU to our point of presence at AT&T is provided by IDEA ONE. That is a metro telecommunications company. I believe in Bismarck it is MDU. We have fiber from AT&T going east/west and they also provide operation and maintenance on that. North/south we work with Midcontinent Communications.

Rep. Vicky Steiner: How much money are we talking?

Marc Wallman: I can tell you what we submitted to the university system office. The full amount we requested is $1.87 million per biennium so divide that by 2 for your annuals. With the Internet2 partnership we are not expecting to see cost saving on that for about two years. Our expectation is that $1.8 million is going to be reduced to about $1.5 million per biennium.

Rep. Bill Amerman: This is all pretty new to me. Are you in any way in direct competition with private industry with the state dollars?

Marc Wallman: We are prohibited under a number of laws. Century code prohibits us from competition. The short answer is no. We are restricted by Public Service Commission. We are also restricted by contracts on our fiber. AT&T doesn't want us to resell services and undercut them. Part of our contract prevents competition there. The same is with Midcontinent Communications. We only provide connectivity to Internet2 which is the nation's research and education network so higher education institutions primarily, national laboratory is one of them.

There was no one opposed or neutral to this bill.

The hearing was closed.

2011 HOUSE STANDING COMMITTEE MINUTES

House Government and Veterans Affairs Committee
Fort Union Room, State Capitol

SCR 4003
March 18, 2011
15697

☐ Conference Committee

Committee Clerk Signature Carmen Hart

Explanation or reason for introduction of bill/resolution:

Supporting the Northern Tier Network Technology

Minutes:

Chairman Bette Grande opened the discussion on SCR 4003. I asked Jennifer Clark to get me some information as to why this amendment doesn't read right. I don't know if this is helpful or not. I just haven't had a chance to read it. I appreciate your comments saying that you had no intention of competing with the private industry. In looking at the resolution in the first whereas it kind of gives a definition of northern tier. Would you be comfortable if we added some kind of language from century code that states that it is only for the purpose of supporting the research and education missions of NDUS? We would have no objection to that. That is our stance. My question was that language on Line 4 and 5, for the purpose of supporting the research and education missions of the North Dakota. It is like there is a comma or something isn't quite right there to me.

Rep. Lonny Winrich: The northern tier network I don't think owns any hardware of its own. It contracts with private companies, AT&T, or whoever has the lines in order to make these connections. They are used primarily by research institutions for their communications.

Chairman Bette Grande: When you read that, shouldn't there be a comma or something? Or just for the purpose of supporting, the research and education missions of North Dakota, Something just doesn't flow right to me and I don't know why I am missing it.

Rep. Lonny Winrich: It seems to scan alright for me.

Chairman Bette Grande: It is such a run on, long sentence that I feel like I get lost in it when I read it.

Rep. Vicky Steiner: Make it another whereas at the end.

Rep. Gary Paur: Should there be a colon after from? It is a listing after that.

Chairman Bette Grande: It is talking about the purpose boom and then you get into. Yes, a colon or a semicolon right there from, but it can't be one sentence. North Dakota university systems from

Rep. Lonny Winrich: The whole resolution is one sentence usually.

Chairman Bette Grande: There should be some type of a break right there. If you need a semicolon there, put the semicolon in.

Rep. Lonny Winrich: That is within one whereas clause.

Rep. Vicky Steiner: Just do the original and do another whereas (rest inaudible, didn't have the microphone on).

Rep. Mark Sanford: When I read this, the purpose at the end which I agree is awkward I think is meant to identify the perimeters of where the northern tier will support the research and mission. The mission is probably beyond those borders that are delineated there. The mission is broader than that but here is where the northern tier will support within these limits.

Chairman Bette Grande: The way it is written is correct.

Rep. Vicky Steiner: You want to put in the two commas.

Rep. Lisa Meier: It might read better with commas.

Rep. Roscoe Streyle: Would we like to add anything about the private entities putting their two cents in instead of thanking a state funded network? I think that seems odd that we are going to thank ourselves for a state funded network. The full thing isn't state funded.

Chairman Bette Grande: Marc Wallman does say North Dakota telecommunication companies have played and will continue to play a vital role in North Dakota's ability to use the NTN-ND. That would be okay to put something like that in there.

Rep. Bill Amerman: I am still a little surprised that no one was opposed or neutral to this. He mentioned a Mr. Kruthers (?) having concerns.

Chairman Bette Grande: He does have concerns. He has voiced those more privately and the same with AT&T. It would probably be helpful to put in a whereas that says whereas North Dakota telecommunication companies have played and will continue to play a vital role in North Dakota's ability to use the northern tier networks. I think it is important to acknowledge that for them.

Rep. Karen Rohr: I would agree with that as well.

Rep. Lisa Meier made the motion.

Rep. Vicky Steiner seconded the motion.

Chairman Bette Grande: I have a motion on the table to put a whereas in and we could put the fourth whereas in that would state North Dakota telecommunication companies have played. You have heard my language on that.

Rep. Mark Sanford: Just an option. It might be up in Line 1 and 2 to simply say resolution supporting northern tier technology initiative and its highly enterprise partners or something to that effect.

Rep. Lonny Winrich: I was looking at the front page of this orange brochure that was passed out. There are a whole bunch of partners listed down there. I was thinking along the same lines as Rep. Sanford. I would support that suggestion.

Chairman Bette Grande: A concurrent resolution supporting the northern tier network technology initiatives and its private enterprise partners and the related activities of the blah, blah, blah.

Rep. Gary Paur: I starting getting immersed in the language in that first whereas from Seattle, Washington, etc. Did we come up with any punctuation for that?

Chairman Bette Grande: No.

Rep. Gary Paur: I think that is improper. Either after university system there should be a semicolon or a colon and then the whole rest of it should be rewritten.

Chairman Bette Grande: I do have to back up just a little bit because I do have a first motion on the table of adding that fourth whereas to include the language of the teleco. I want to move that motion or further amend that amendment.

Rep. Lonny Winrich: The motion is to add the whereas?

Chairman Bette Grande: That motion is on the table. Now if we are talking about further amending that whereas to these other things or do you wish to make and finish off that motion is where I am at? Let's just stick to the motion that is on the table. That is where our discussion is solely at that level.

Rep. Lonny Winrich: I would prefer the option that Rep. Sanford suggested as a substitute because it identifies the specific partners, the ones that are contributing to the project rather than a general collective description.

Chairman Bette Grande: I like the whereas and I would like to further amend that into the language of that because I think we need to address the telecos but we also need to address these partners.

Rep. Roscoe Streyle: I would make a motion to further amend to adding it into the title also as previously written.

Rep. Karen Rohr seconded the motion.

Chairman Bette Grande: Go from adding on to the whereas and adding in the Sanford language after the word initiative on Line 1 in stating and its private enterprise partners, and the relative activities... We have two amendments but we are all in one amendment at this point. Rep. Paur, where would you like to put the semicolon? Let us get this amendment off the table.

A voice vote was taken to adopt the amendment. Motion carried.

Rep. Gary Paur: I wasn't proposing an amendment. I was just making an observation that I believe there should either be a colon because everything after university system on Line 5 or a semicolon. I think a colon would be more appropriate. After that the whole thing I believe is messy and needs some better punctuation. There are people that are more qualified than I am in the room.

Chairman Bette Grande: I would like to see a colon or semicolon there.

Rep. Lonny Winrich: I do agree the sentence is long and rather cumbersome but I also think it is grammatically correct. We have such a difference of opinion around the table. Maybe we need to go back to Jen Clark or whoever drafted it and talk a little bit more there at that level.

Rep. Bill Amerman: This resolution will not become law. It is not going to be codified in the book so we have to go back and change anything. If you want to put a colon, a period, and two commas or whatever we want to do, it doesn't make any difference.

Chairman Bette Grande: That is true. We are working awful hard on this, aren't we? At that point I am going to let it just go. We have the amended resolution before us.

Rep. Lisa Meier made a motion for a Do pass as amended.

Rep. Mark Sanford seconded the motion.

DO PASS AS AMENDED, 13 YEAS, 0 NAYS. Rep. Lisa Meier is the carrier of this bill.

Date: 3-18-11
Roll Call Vote #: 1

2011 HOUSE STANDING COMMITTEE ROLL CALL VOTES
BILL/RESOLUTION NO. 4003

House GOVERNMENT AND VETERAN AFFAIRS Committee

☐ Check here for Conference Committee

Legislative Council Amendment Number _____

Action Taken ☐ Do Pass ☐ Do Not Pass ☐ Amended ☐ Adopt Amendment

☐ Rerefer to Appropriations ☐ Reconsider

Motion Made By Meier Seconded By Steiner

Representatives	Yes	No	Representatives	Yes	No
Chairman Bette Grande			Bill Amerman		
Vice Chairman Randy Boehning			Ron Guggisberg		
Glen Froseth			Lonny Winrich		
Karen Karls					
Lisa Meier					
Gary Paur					
Karen Rohr					
Mark Sanford					
Vicky Steiner					
Roscoe Streyle					

Total (Yes) _____ No _____

Absent _____

Floor Assignment _____

If the vote is on an amendment, briefly indicate intent:

motion made to put on hold whereas was like 1st part of the amend

Date: 3-18-11
Roll Call Vote #: 2

2011 HOUSE STANDING COMMITTEE ROLL CALL VOTES
BILL/RESOLUTION NO. 4003

House GOVERNMENT AND VETERAN AFFAIRS Committee

☐ Check here for Conference Committee

Legislative Council Amendment Number

Action Taken ☐ Do Pass ☐ Do Not Pass ☐ Amended ☑ Adopt Amendment

☐ Rerefer to Appropriations ☐ Reconsider

Motion Made By Streyle Seconded By Rohr

Representatives	Yes	No	Representatives	Yes	No
Chairman Bette Grande			Bill Amerman		
Vice Chairman Randy Boehning			Ron Guggisberg		
Glen Froseth			Lonny Winrich		
Karen Karls					
Lisa Meier					
Gary Paur					
Karen Rohr					
Mark Sanford					
Vicky Steiner					
Roscoe Streyle					

Total (Yes) No

Absent

Floor Assignment

If the vote is on an amendment, briefly indicate intent:

Voice vote to amend the amendment motion carried

VR
3/18/11

11.3024.03001
Title.04000

Adopted by the Government and Veterans Affairs Committee
March 18, 2011

PROPOSED AMENDMENTS TO ENGROSSED SENATE CONCURRENT RESOLUTION NO. 4003

Page 1, line 1, after "Initiative" insert ", its private enterprise partners,"

Page 1, line 13, after the semicolon insert "and

WHEREAS, North Dakota telecommunication companies have played and will continue to play an important role in supporting the Northern Tier Network Technology Initiative;"

Page 1, line 17, after "Initiative" insert ", its private enterprise partners,"

Renumber accordingly

Date: 3-18-11
Roll Call Vote #: 3

2011 HOUSE STANDING COMMITTEE ROLL CALL VOTES
BILL/RESOLUTION NO. 4003

House GOVERNMENT AND VETERAN AFFAIRS Committee

☐ Check here for Conference Committee

Legislative Council Amendment Number _____

Action Taken ☒ Do Pass ☐ Do Not Pass ☒ Amended ☐ Adopt Amendment

☐ Rerefer to Appropriations ☐ Reconsider

Motion Made By Meier Seconded By Sanford

Representatives	Yes	No	Representatives	Yes	No
Chairman Bette Grande	✓		Bill Amerman	✓	
Vice Chairman Randy Boehning	✓		Ron Guggisberg	✓	
Glen Froseth	✓		Lonny Winrich	✓	
Karen Karls	✓				
Lisa Meier	✓				
Gary Paur	✓				
Karen Rohr	✓				
Mark Sanford	✓				
Vicky Steiner	✓				
Roscoe Streyle	✓				

Total (Yes) 13 No 0

Absent 0

Floor Assignment Meier

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

SCR 4003, as engrossed: Government and Veterans Affairs Committee (Rep. Grande, Chairman) recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends **DO PASS** (13 YEAS, 0 NAYS, 0 ABSENT AND NOT VOTING). Engrossed SCR 4003 was placed on the Sixth order on the calendar.

Page 1, line 1, after "Initiative" insert ", its private enterprise partners,"

Page 1, line 13, after the semicolon insert "and

WHEREAS, North Dakota telecommunication companies have played and will continue to play an important role in supporting the Northern Tier Network Technology Initiative;"

Page 1, line 17, after "Initiative" insert ", its private enterprise partners,"

Renumber accordingly

2011 TESTIMONY

SCR 4003

62ND LEGISLATIVE ASSEMBLY

SCR 4003, Senate Appropriations Committee

Northern Tier Network—North Dakota

Marc Wallman

North Dakota State University

January 20, 2011

January 20, 2011

Mr. Chairman and members of the Committee. For the record, I am Marc Wallman, Assistant Vice President for Enterprise Computing and Infrastructure at North Dakota State University. On behalf of the Northern Tier Network—North Dakota (NTN-ND) members from ND ITD, UND and NDSU, I thank you for giving us this opportunity to update you on the Northern Tier Network as well as to respond to questions you may have. Bonnie Neas, NDSU's VP for IT, who usually gives this report sends her regrets.

Figure 1: National Research and Education Network (Internet2) Circa 2003. Founding Northern Tier Member States Highlighted.

First, I would like to begin with some background information on the Northern Tier Network. The Northern Tier Network Consortium (NTNC) was established in 2003. The founding member states, highlighted on the map in Figure 1, wished to address the fact that the nation's research and education network had for years bypassed our region of the country. This lack of service to our region of our region **(1)** threatened to disenfranchise Northern Tier states from research activities, including competing for grant money, **(2)** to prevent participation in the future development of the country's research and education network, which supports local to global economic vitality.

Shortly after being founded, the NTNC received a grant from the National Science Foundation to fund an analysis of existing high capacity broadband options in the Northern Tier states as well as an analysis of the options available for deploying a dark fiber network in these states. Following the completion of the study in 2006, Northern Tier states were able to secure sufficient funding to establish an east-west connection between Seattle and Chicago. In 2007, the North Dakota Legislature committed $2,773,800 in startup funds for North Dakota's portion of this network that were added to $3.2 million of equipment contributed by the federal government via the Department of Defense

The remainder of the report will consist of the following: (1) A review of how NTN-ND has met its initial goals, (2) A review of the FY07-09 report, (3) A review of the cost comparison requested by the Interim IT Council on October 14th, 2010. (4) NTN-ND is a snapshot as it exists today.

The initial goals of the NTNC were to (1) ensure competitiveness for the region's research activities in support of its economic vitality, and (2) ensure our region's participation in the ongoing development of the nation's research and education network, which supports economic vitality. How have we done?

With regard to competitiveness in research activities, while we have certainly made important strides, I believe that we are only beginning to see the impact of the Northern Tier Network. Computational research is a growing field at UND and NDSU and the demands we see today are expected to significantly expand in the future. In the Fall of 2010, Dr. Svetlana Kilina, a computational chemist at Los Alamos National Lab, joined the faculty at NDSU. She brought with her a substantial amount of data from her previous research activities. NTN-ND reduced the time to transfer her research data from what would have been a few days before NTN-ND down to a couple of hours. This ability to quickly transfer large data sets will provide Dr. Kilina with future opportunities to share her work with potential collaborators.

The economic impacts of research activities often take time before they are fully realized. We expect NTN-ND to enable research that will contribute to our states economic vitality. In the meantime, NTN-ND has created an immediate economic impact by driving demand for high performance network capacity. Upgrades to STAGEnet metro connections have already taken place in Fargo as a result of NTN-ND. Work on NTN-ND interconnects in Bismarck is underway. We expect this demand to not only continue, but to increase with time.

With regard to ensuring our region's participation in the ongoing development of the nation's research and education network, NTN-ND has been an unqualified success. In July of 2010, the National Telecommunications and Information Administration (NTIA) awarded Internet2 $62.5 million in funding to deploy a singificant enhancements to the nation's research and education network. The NTNC was a partner in this grant submission and will play a key role in the networks deployment and ongoing operation. Further, this partnership will provide NTN-ND with improved service and reduce operating costs by approximately $300,000,000 per biennium. NTN-ND is now, literally, on the map.

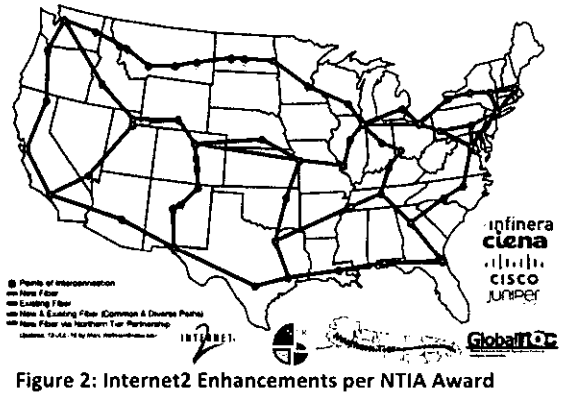

Figure 2: Internet2 Enhancements per NTIA Award

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In January of 2009, NTN-ND submitted a preliminary report to the legislature, outlining activities and progress made during the 07-09 bienium. This report, along with an addendum detailing accomplishments between January 2009 and June 30, 2009 has been distributed with a copy of my testimony. Of the materials provided in this report, there are two items I would like to highlight. First is a map showing the deployment of NTN-ND and its relationship to STAGEnet, the state network operated by ND ITD. The map I have included as part of my testimony is derrived from one in the 07-09 report. It shows the routes for both the STAGEnet backbone and NTN-ND. Also included in this map is the South Dakota interconnect, which was funded by an NSF grant, jointly awarded to North Dakota and South Dakta in 2010. Returning to the relationship between STAGEnet and NTN-ND, there are several remarks I would like to make. First, the map in Figure 3 shows both STAGEnet and NTN-ND backbones. For NTN-ND, this is the whole story. It is only a backbone. STAGEnet is much more. It connects government and educational institutions across the state. There are many regional and local network links that are not pictured in this diagram. NTN-ND is part of a national backbone-only network. It does not and will not provide connectivity beyond points-of-presence indicated by the green dots on the map in Figure 3. North Dakota telecommunications companies have played and will continue to play a vital role in North Dakota's abilty to use NTN-ND.

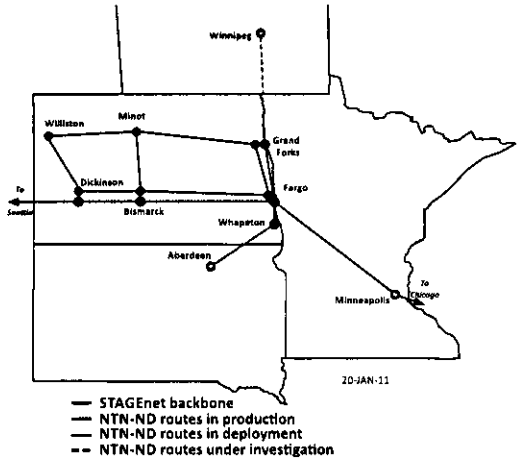


Figure 3: NTN-ND and STAGEnet

The second item that I would like to highlight from this report is the FY08 and FY09 expenditures. I have included charts illustrating FY08 and FY09 expenditures with my testimony. Most of the expenditures in 07-09 came in FY09. That year saw the transition from deployment to production. Expenses during this year included both deployment and operating costs. They were primarily for hardware and telecommunications services. No additional positions have been created at ND ITD, UND, or NDSU with NTN-ND money.

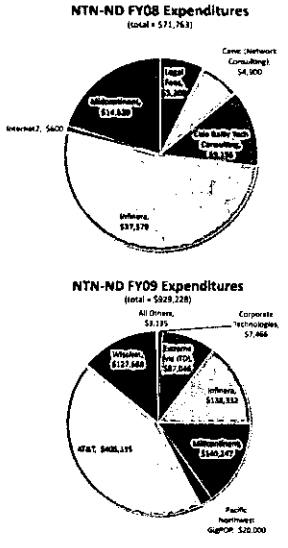


Figure 4: 07-09 Expenditures

At the October 14th, 2010 meeting of the Legislature's Information Technology Committee, there was a request that NTN-ND estimate the cost to acquire equivalent services, if the existing network were not funded. A report has been included with my testimony with this estimate. The report provides a cost comparison with a services bid submitted for an RFI in 2007. It was compared with NTN-ND annual operating costs as submitted to the State Board of Higher Education for inclusion in the University System's appropriation request for this session. This particular cost comparison suggests a tenfold increase would be required to purchase equivalent services to what currently exists in NTN-ND.

Finally, I would like to conclude with a few remarks on the current state of NTN-ND. In October 2010, Bonnie Neas submitted testimony to the Information Technology Committee that included new developments. These include the Internet2 NTIA grant, the NSF grant to connect North and South Dakota, and an NSF award to NTN-ND and the University of Washington to improve network services between Seattle and Chicago. We continue to make progress on these initiatives and expect to have substantial completion on them within 18 months.

NTN-ND Cost Comparison

Prepared January 4, 2011

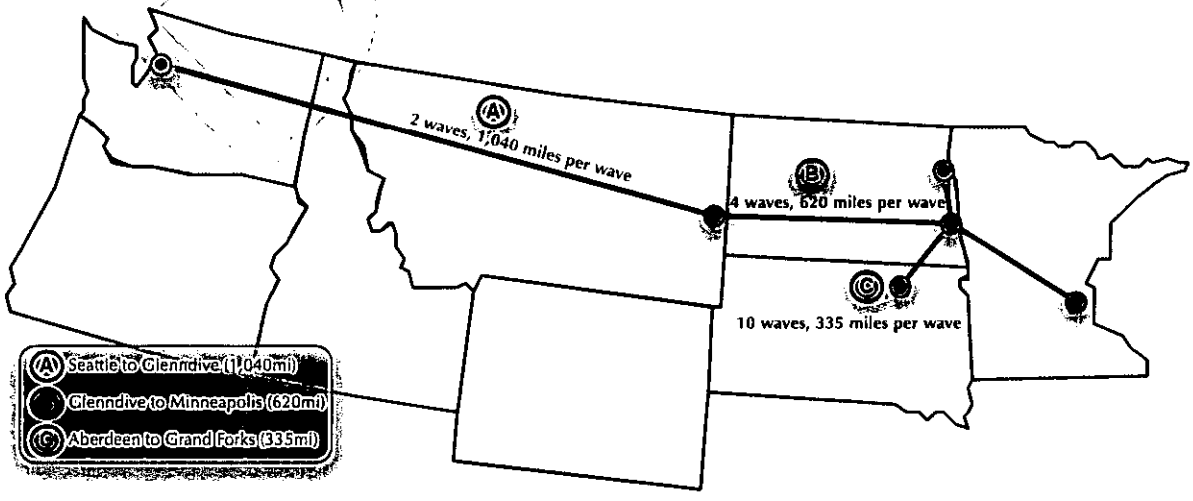
This report is provided at the request of the North Dakota Legislature's Information Technology Committee. As reflected in the minutes of the October 14, 2010 committee meeting in Bismarck, there was discussion of the possible effects of NTN-ND not receiving ongoing funding. As part of this discussion, Ms. Bonnie Neas, Vice President for Information Technology at North Dakota State University, offered to provide a report estimating costs that would be incurred by the North Dakota University System to purchase services equivalent to existing NTN-ND services.

This report provides an estimate of what would be required by the North Dakota University System to purchase services equivalent to what NTN-ND offers. The table below compares current NTN-ND operating costs as of Fall 2010, to a vendor response to an RFI for dark fiber between Fargo and Grand Forks. While the RFI was for dark fiber between Fargo and Grand Forks, one vendor provided a services based response. While dated, this was the most reliable cost data that was available.

Solution	Cost per wave mile	Wave Miles	Annual Cost
Current NTN-ND w/o Internet2 Partnership	$ 118	7,910	$ 935,700
Current NTN-ND with Internet2 Partnership	$ 99	7,910	$ 786,100
Services Model (2007 RFI Response)	$ 1,239	7,910	$9,800,490

Method of Comparison

In order to make a more accurate comparison, the costs from the 2007 vendor response were converted to the cost of one mile of a 10Gb data wave (i.e., a one 10Gbps data link). This figure was then used to calculate the cost equivalent of purchasing 7,910 miles of 10Gb links (i.e., purchasing services that are equivalent to what NTN-ND currently offers). Current NTN-ND services are also shown in the diagram below.



07-09
BIENNIAL REPORT

Northern Tier Network
North Dakota State University,
University of North Dakota and
North Dakota Information Technology Department

PARTNERS

Pacific Northwest GigaPOP (PNWGP)‡
AT&T Fiber Broker, Network Engineering
www.pnwgp.net

The University of Washington
Operator of PNWGP
www.washington.edu

BOREAS-Net‡
Eastward Transport Network
www.boreas.net

Northern Lights GigaPOP‡
Internet2 Data Service Provider
www.northernlights.gigapop.net

WiscNet‡
Network Operations Center
www.wiscnet.net

CENIC‡
Consulting
www.cenic.org

Eide Bailly
Consulting
www.eidebailly.com

Qwest
Infinera Equipment Reseller
www.qwest.com

Midcontinent Communications (MidCo)
Dark Fiber (North-South) and Related Services
www.midcocomm.com

The Defense Research and Engineering Network (DREN)
Federal Funding Agency
www.hpcmo.hpc.mil/Htdocs/DREN

AT&T
Dark Fiber (East-West) and Related Services
www.att.com

IdeaOne
Fargo Local Loop
www.ideaone.com

The Northern Tier Network Consortium‡
Regional Research and Education Network Consortium
www.ntnc.org

Montana University System
Westward Transport Network
www.mus.edu

‡ Denotes institutions affiliated with higher education.

> FORWARD Thank you to Gov. John Hoeven, the North Dakota Legislature and Sen. Byron Dorgan for your financial support, without which this endeavor would not have been possible.

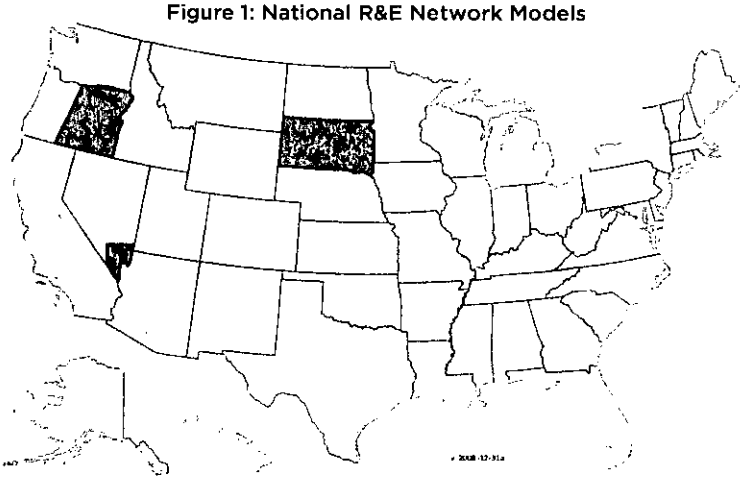
The Northern Tier Network Consortium (NTNC)

BACKGROUND

Efforts to provide connectivity to the nation's high-speed research and education network backbone for universities in North Dakota and other states in the upper Midwest have been under way since the mid-1990s. This was in response to the lack of competitiveness in the region's advanced networking capabilities in support of the educational, research and economic vitality of the Northern Tier region. The Northern Tier Network Consortium (NTNC) was established in 2003 primarily by higher education representatives from seven states — today the membership represents 12 states.

This regional network initiative is an attempt to provide a robust research network connection for educational institutions and federal research laboratories in upper-Northwestern states by creating a national backbone route across the Northern Tier states between Chicago to the east and Seattle to the west. Northern Tier Network Consortium state members include Michigan, Wisconsin, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Montana, Idaho, Wyoming, Washington and Alaska.

Figure 1: National R&E Network Models



Dark fiber R&E network (existing or in deployment)
Planning under way for dark fiber R&E network
Telco provided data services R&E network
ATM R&E network

Great strides have been made both in our region and nationally to strengthen and expand this resource that is so critical to our global competitiveness. Most of our nation is served now by a research and education network like the one being deployed in North Dakota (see Figure 1). As of 2006, more than 35,000 route-miles of dark fiber were held by U.S. research universities.[1] Northern Tier connects to the U.S. Internet2 (www.internet2.edu)[2] and National Lambda Rail (www.nlr.net)[3] networks and other international research and education networks at points in Chicago and Seattle. Without Northern Tier connections to these networks, other regions surpassed this region's network capacity by a factor of 10 or more.

North Dakota's serious efforts in deploying its share of the Northern Tier Network began in 2005 when a $200,000 planning grant was acquired by North Dakota, South Dakota, Montana and Idaho. This grant funded a consultant who developed a network-engineering plan that provided the basis for the Northern Tier Network footprint across these four states. As a follow-up to this planning effort, in September 2006, Sen. Byron Dorgan secured $3.25 million in seed money for NDSU to be used in consultation with University of North Dakota and the state's Information Technology Department for North Dakota's Northern Tier Network project. Gov. Hoeven followed suit by including the remainder of the required funding in his FY08-FY09 budget.

In spring 2007, the North Dakota Legislature offered its endorsement in the form of a $2.73 million appropriation. To manage this joint project, UND, ITD and NDSU entered into a three-party agreement, with NDSU acting as the fiscal agent and primary point of contact for Northern Tier Network issues. This group and the Northern Tier Network segments the group is responsible for have been dubbed Northern Tier Network-North Dakota (NTN-ND).

[1] See www.ces.net/doc/seminars/20060529/pr/preston.pdf.
[2] Internet2 promotes the missions of its members (200 higher education institutions) by providing both leading-edge network capabilities and unique partnership opportunities. It links member campuses and laboratories with a broader community which includes U.S. government and company research laboratories, and research and education networking organizations in countries around the world.
[3] National Lambda Rail is a research focused network that is owned and controlled by the U.S. research community, which provides infrastructure connecting the nation's major research universities and national labs.

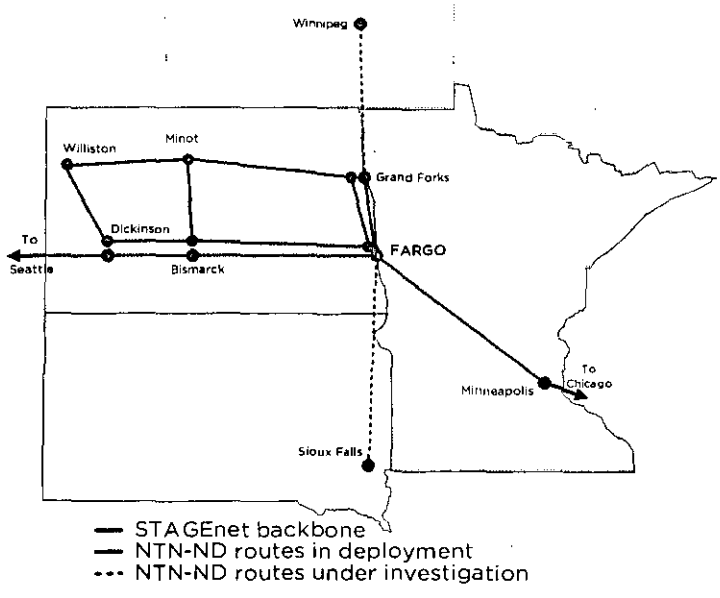
PROGRESS TO DATE

Significant progress has been made to date on deployment of NTN-ND. The base NTN-ND deployment is well under way. The network is expected to have a point-of-presence (POP) in the cities of Dickinson, Bismarck, Fargo, and Grand Forks by Q1 2009 (see Figure 2). Connections from NDSU and UND to their respective local POPs also should be completed by Q1 2009. ITD and the North Dakota University System currently are working with local telecommunications companies to establish POP links in Dickinson and Bismarck, but these connections are unlikely to go live until sometime after Q1 2009.

In an effort to clarify the relationship between STAGEnet and NTN-ND, it should be noted that NTN-ND is a backbone-only network. It does not and will not provide connectivity beyond the points-of-presence in the cities noted by orange dots in Figure 2. When up and operational, NTN-ND will take the place of the North Dakota University System's current Internet2 transport link. This link with connectivity from Fargo to Minneapolis has been in place since 2000. Prior to that, Internet2 research transport was accommodated by the Great Plains Network with a link from Fargo to Kansas City (1997-2000).

Institutions not directly connected to a NTN-ND POP, such as the remaining North Dakota University System institutions, will need to have their Internet2-bound data — destined for out-of state locations — transported over STAGEnet to the nearest NTN-ND POP.

Figure 2: NTN-ND and STAGEnet backbone routes



While much has been done, everything is not complete. NTN-ND is investigating two additional partnerships, one with CANARIE (Canada's national research network) and the other with the South Dakota University System. We expect to have sufficient startup money to choose one of these two routes and hope to find sufficient funds to cover ongoing expenses. (These routes are diagramed in Figure 2). Negotiations are currently under way with both parties. When complete, North Dakota will serve as an upper Midwest crossroads for national and international research and education high-speed Internet traffic.

USE AND RESTRICTIONS

As previously noted, NTN-ND will replace the North Dakota University System's current Internet2 transport link when it becomes operational. The initial deployment will be 10 10Gbps circuits, scalable to 40 10Gbps circuits. Peering agreements with Montana and Washington will allow for shared use of the initial 10 circuits.

Even though the North Dakota University System will abide by existing language passed during the 60th Legislative Session - NDCC § 15-10-45 - we continue to believe this language is ambiguous and unnecessary since paragraphs 14-16 in NDCC § 54-59-05 already prevent state competition with private companies. Further, NTN-ND has agreements in place with AT&T and Midcontinent Communications (see Appendix A). Those agreements include non-compete clauses, which prevent the kind of activities NDCC § 15-10-45 is concerned with.

EXPENDITURES

NTN-ND has two primary sources of funding. The first is $3.25 million secured by Sen. Byron Dorgan through the Defense Research and Engineering Network (DREN), which falls under the Department of Defense. The second source of funding is $2.73 million in state funds appropriated during the 2007 legislative session. Both of these funding sources represent one-time funds. NTN-ND is currently working with ongoing funding and expects to need $1 million annually starting in FY11 (July 1, 2010) in order to operate the full network.

Federal funding was used exclusively to purchase equipment (see Figure 3). Department of Defense - Defense Research and Engineering Network (DREN) acquired this equipment based on NTN-ND specifications and is in the process of completing the necessary paperwork to transfer ownership to NTN-ND. Equipment was purchased from Cisco Systems and from Qwest for Infinera.

NTN-ND expenditures can be grouped into four main categories:

- Fiber optic cable
- Equipment
- Consulting
- Operating

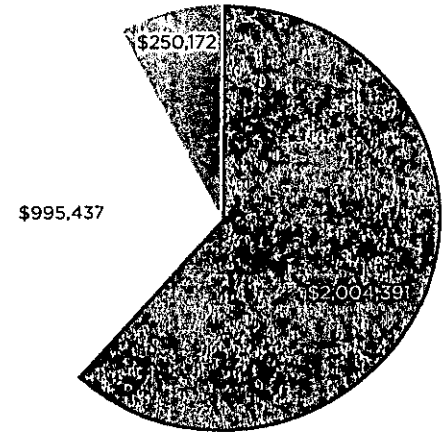
Expenditures on fiber include IRU (indefeasible right of use) agreements, operating and maintenance fees, and fees for rack space and power in communications huts. Certifying the fiber and associated installation fees for the route running from the Montana-North Dakota border to Minneapolis (see Figure 4) were paid to AT&T and facilitated by PNWGP. This fiber was provided to Washington, Idaho, Montana, North Dakota, Minnesota and Wisconsin by the Pacific Northwest GigaPOP (PNWGP).[4] This fiber was available to North Dakota at no cost via PNWGP, and, therefore, was not competitively bid. Sole-source acquisition paperwork for this fiber was filed at NDSU.

Fiber optic cable from Grand Forks to Fargo did go through a competitive bidding process, which was overseen by NDSU's Purchasing Department and General Counsel, with additional legal counsel from Caplan and Earnest LLC, a Denver firm. This bid was awarded to Midcontinent Communications and includes options to acquire additional fiber north to Canada and south to Sioux Falls. NTN-ND still is investigating the feasibility of these routes and associated partnerships.

While federal funding provided the vast majority of the equipment necessary for NTN-ND, it did not cover 100 percent of our equipment needs. The remaining required equipment was Infinera equipment and was purchased with state funds. The pricing was based on a competitive bidding process conducted by BOREAS-Net, a regional networking consortium composed of the University of Minnesota, University of Wisconsin-Madison, University of Iowa and Iowa State University, all Northern Tier Network Consortium members.

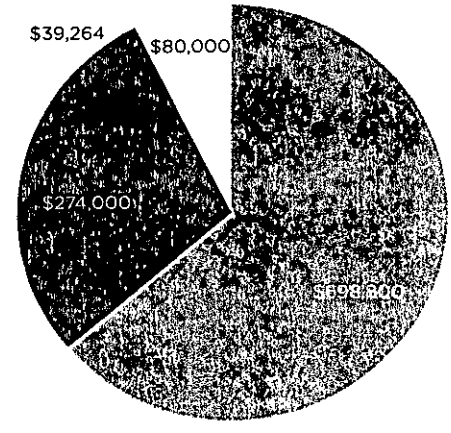
[4] This fiber falls under a larger effort by AT&T and the Southeast University Research Association (SURA) to promote dark fiber ownership by research universities. Approximately 6,000 route-miles of AT&T fiber throughout the nation were made available through an agreement between these two entities.

Figure 3: Federal Expenditures



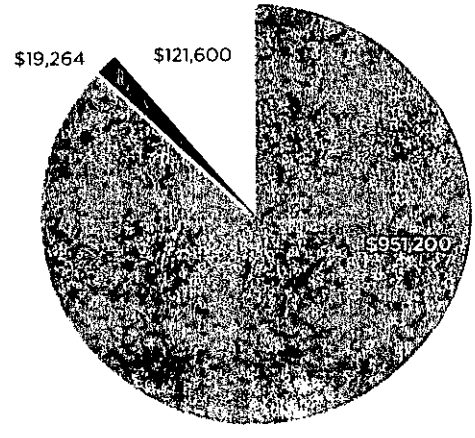
NTN-ND Federal One-Time Equipment Expenditures
Federal Overhead Cisco Qwest/Infinera

Figure 4: State Funded Startup Expenditures



Expenditures by Category
MT-ND border to Minneapolis; Fargo to Grand Forks
Fiber Equipment Consulting Operating

Figure 5: State Funded Startup Expenditures



Expenditures by Industry
MT-ND border to Minneapolis; Fargo to Grand Forks
Telecommunications Consulting Higher Education

Operating fees associated with our startup expenditures are primarily for network operations. An external vendor was sought to provide operational oversight of NTN-ND. This includes services such as network configuration changes, monitoring and troubleshooting. WiscNet was selected to provide NTN-ND Network Operations Center (NOC) services through a competitive bidding process. (WiscNet also provides NOC services to BOREAS-Net.)

Finally, some consulting services were required during implementation. Services included network engineering (PNWGP), planning and budgeting (CENIC), and project management for our competitive bids (CENIC and Eide Bailly).

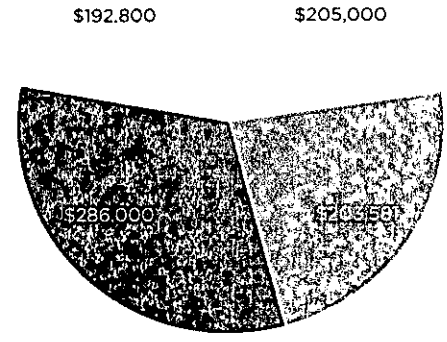
The various industries benefiting from state and federal NTN-ND funds are shown in Figure 5 on page 3.

As part of its fiscal planning efforts, NTN-ND has built an annual budget based on costs that it currently is committed to. These costs are preliminary, since the operating expenses for extending NTN north toward Canada or south to South Dakota have not been calculated. There are currently insufficient implementation details to make reliable cost estimates for connections to Canada or to South Dakota.

The categories for projected annual expenditures are analogous to the startup costs (see Figure 6). Expenditures are projected for operating, fiber, depreciation and maintenance. Operating expenses are primarily for NOC services. Fiber expenditures are composed of operating and maintenance fees, as well as rack and power fees paid to AT&T and MidContinent Communications. Depreciation represents the amount of money that needs to be set aside annually in order to replace equipment purchased during startup when it reaches end-of-life. Maintenance fees are ongoing fees paid to equipment vendors for ongoing support, part replacement and software upgrades.

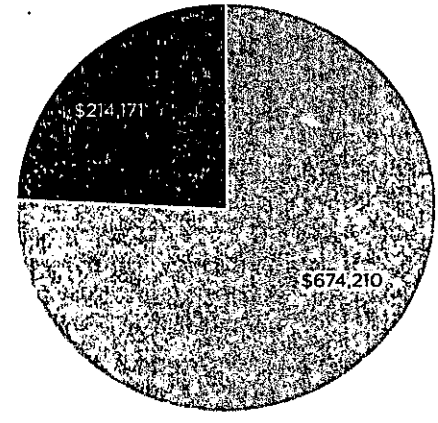
The industries receiving financial benefit from the ongoing operation of NTN-ND are higher education and telecommunications. The dollar amounts for each of these sectors are shown in Figure 7.

Figure 6: Projected Annual Expenditures by Category



Expenditures by Category
MT-ND border to Minneapolis; Fargo to Grand Forks
Operating ◻ Fiber ■ Depreciation Maintenance

Figure 7: Projected Annual Expenditures by Industry



Expenditures by Industry
MT-ND border to Minneapolis; Fargo to Grand Forks
◻ Telecommunications ■ Higher Education

Appendix A

Use Restrictions in the North Dakota Century Code, AT&T IRU, and Midcontinent Communications IRU

§ 15-10-45 Telecommunications and information services competition prohibited.

1. The Northern Tier Network, part of a national research network infrastructure, serves entities within and outside this state. The North Dakota University System may use the Northern Tier Network infrastructure only for the purpose of supporting the research and education missions of the North Dakota University System. The North Dakota University System may not use the Northern Tier Network infrastructure for traditional Internet, voice, video or other telecommunications services beyond those required for research networks.
2. The North Dakota University System or any entity associated with the university system may not resell any portion of the Northern Tier Network infrastructure to nonuniversity entities other than research collaborators.
3. The Northern Tier Network may not replace any wide area network services to any city, county or school district which are provided by the information technology department under section 54-59-08.
4. The North Dakota University System shall provide a comprehensive biennial report of Northern Tier Network activities for the 2007-09 biennium and must submit to a biennial audit of the Northern Tier Network activities beginning with the 2009-11 biennium.

§ 54-59-05 Powers and duties of department. The department:

14. May provide wide area network services to a state agency, city, county, school district or other political subdivision of this state. The information technology department may not provide wide area network service to any private, charitable or nonprofit entity except the information technology department may continue to provide the wide area network service the department provided to the private, charitable and nonprofit entities receiving services from the department on January 1, 2003. The department shall file with the state auditor before September 1, 2003, a description of the wide area network service the department provided to each private, charitable and nonprofit entity receiving services from the department on January 1, 2003.
15. Shall assure proper measures for security, firewalls and Internet protocol addressing at the state's interface with other facilities.
16. Notwithstanding subsection 14, may provide wide area network services for a period not to exceed four years to an occupant of a technology park associated with an institution of higher education or to a business.

§ 54-59-08. Required use of wide area network services. Each state agency and institution that desires access to wide area network services and each county, city and school district that desires access to wide area network services to transmit voice, data or video outside that county, city or school district shall obtain those services from the department. The chief information officer may exempt from the application of this section a county, city or school district that demonstrates its current wide area network services are more cost-effective for or more appropriate for the specific needs of that county, city or school district than wide area network services available from the department. The chief information officer shall exempt from the application of this section a county, city or school district that is under contract to receive wide area network services from an entity other than the department, for the term of that contract, but that political subdivision may not extend or renew that contract beyond July 31, 2001.

AT&T Contractual Restrictions

"Notwithstanding anything to the contrary in the Collaboration Agreement or elsewhere, SURA and Licensee may allow any for-profit entity that complies with Section 2.1.1.3 of the Collaboration Agreement, as amended, to use the SURA Strands, provided that such entity's use is for scientific and clinical research, technology development and educational purposes. Any other use shall be solely through Section 3.3 of the Collaboration Agreement, if at all, and shall be subject to prior written approval by AT&T."

Midcontinent Contractual Restrictions

Subject to the provisions of this agreement, the university may use the university fibers and the IRU for any lawful research, governmental, educational or other non-commercial purpose. In addition, the parties agree that such use includes providing access to parties who are leasing property in the university's technology park as well as commercial entities who are conducting research under an agreement with the university.

Northern Tier Network 2009 Legislative Report Addendum

In January 2009, North Dakota State University, the University of North Dakota, and the North Dakota Information Technology Department submitted a report with year-to-date information on the 2007-09 biennium. This addendum to the 2009 legislative report details developments that occurred between Jan. 1 and June 30, 2009, and provides information on expenditures for the 2007-09 biennium.

ACTIVITIES (JAN. 1 TO JUNE 30, 2009)

Most of the activity that occurred in the 2007-09 biennium occurred before Jan. 1, 2009. The only significant event that occurred after Jan. 1, 2009, came in April when the North Dakota portion of the Northern Tier Network went into production. At this time, the North Dakota University System's connection to Internet2 (www.internet2.edu) was increased by more than a factor of 50.

ACTUAL EXPENDITURES (2007-09 BIENNIUM)

Expenditures during the 2007-09 biennium consisted entirely of services and equipment. No money was spent on staff or internal services at NDSU, UND or ITD. The bulk of expenditures went to telecommunications service providers and hardware vendors. Table 1 shows FY08 and FY09 expenditures using ConnectND expense categories.

Table 1: NTN-ND FY08/FY09 Expenditures by ConnectND Category

EXPENSE#	EXPENSE DESCRIPTION	FY08	FY09
521000	Travel	$ —	$ —
531000	Data Processing	$3,000	$51,761
533000	Food and Clothing	$ —	$ —
535000	Supplies	$ —	$ —
536000	Office Supplies	$ —	$ —
541000	Post Office/Postage	$ —	$ —
542000	Printing	$ —	$624
551000	IT Equipment Under $5,000	$ —	$ —
591000	Repairs	$ —	$21,261
571000	Insurance	$ —	$ —
602000	Telephone	$ —	$856
611000	Professional Development	$600	$1,200
621000	Operating Fees	$14,520	$833,526
623000	Non-Employee Expenses	$19,264	$20,000
693000	Equipment Over $5,000	$34,379	$ —
TOTAL		$71,763	$929,228

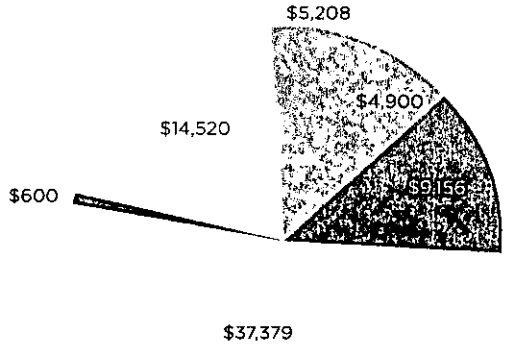
Unfortunately, these categories do not offer a sufficiently clear picture of how NTN-ND funds have been spent during the 2007-09 biennium. To paint a better picture, expenditures by vendor are aggregated in Figures 1 and 2.

In FY08, NTN-ND was still early in deployment. Slightly more than 25 percent of expenditures were for consulting services (legal, network and RFI management) needed to launch the network. More than 50 percent of the expenditures were on hardware required to operate the network. Total expenditures during FY08 were low overall, totaling just $71,763.

By FY09, NTN-ND deployment was in full swing with approximately 75 percent of expenditures going to telecommunications service providers (AT&T, Midcontinent Communications and WiscNet). Slightly less than 25 percent of expenditures went to hardware vendors (Corporate Technologies, Extreme Networks and Infinera). Network Engineering services from the Pacific Northwest GigaPOP accounted for $20,000 in expenditures. Overall expenditures for FY09 totaled just under $930,000.

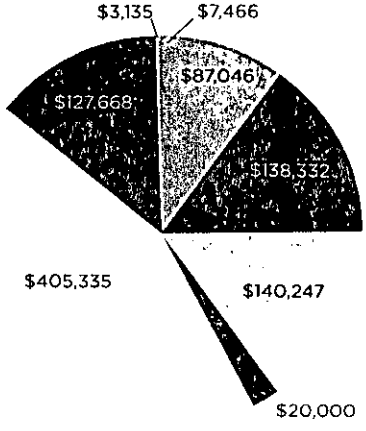
During the 2007-09 biennium, NTN-ND partners agreed not to set aside funds for budgeted hardware replacement. The original NTN budget approved by the 2007 Legislature had $286,000/year reserved for capital refresh. When it was apparent that NTN-ND was not going to receive on-going funds during the 2009 Legislative session, NTN-ND partners decided to use capital reserves to pay ongoing operating costs. During FY08, it also became apparent that our partners in Canada and South Dakota were not ready to share in the costs of extending NTN to their regions. Therefore, to preserve additional funds for on-going operations, NTN-ND decided that grants would be pursued in order to complete the North segment from Grand Forks (UND) to Canada's Advanced Research and Innovation Network (CANARIE) in Winnipeg, and the South segment from Fargo (NDSU) to a point on South Dakota's Research Education and Economic Development (REED) network.

Figure 1: NTN-ND FY08 Expenditures



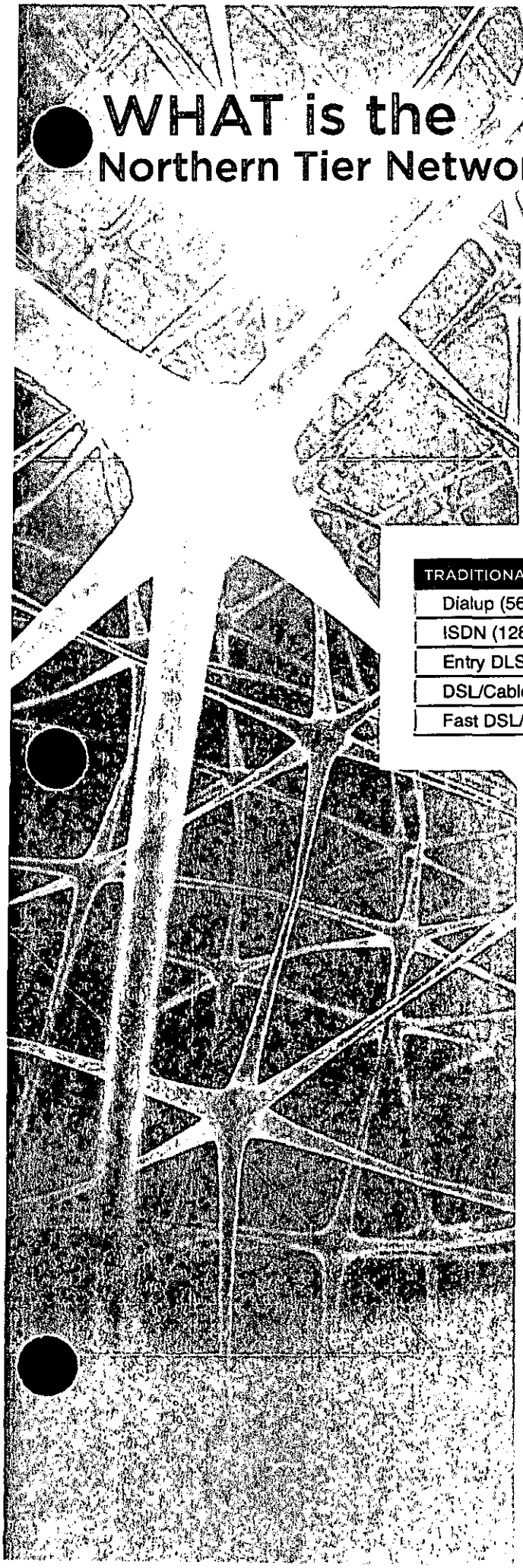
NTN-ND FY08 Expenditures
(total = $71,763)
Legal Fees, $5,208
Cenic (Network Consulting), $4,900
Eide Bailly Tech Consulting, $9,156
Infinera, $37,379
Internet2, $600
Midcontinent, $14,520

Figure 2: NTN-ND FY09 Expenditures



NTN-ND FY09 Expenditures
(total = $929,228)
All Others, $3,135
Corporate Technologies, $7,466
Extreme (via ITD), $87,046
Infinera, $138,332
Midcontinent, $140,247
Pacific Northwest GigPOP, $20,000
AT&T $405,335
WiscNet $127,668

WHAT is the Northern Tier Network (NTN)?



NTN is an ultra high-speed regional network with multiple optical waves capable of transferring about 10 gigabits of information per second per wave.

- NTN supports the research and education mission of its members.
- The NTN region includes 12 Northwest states: Alaska, Idaho, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, South Dakota, Washington, Wisconsin and Wyoming.
- NTN-ND is North Dakota's NTN segment. Each NTN state is responsible for the development and on-going support of its NTN segment with agreements for rights-to-use on other segments. See map on the next page; NTN-ND is the red segment.

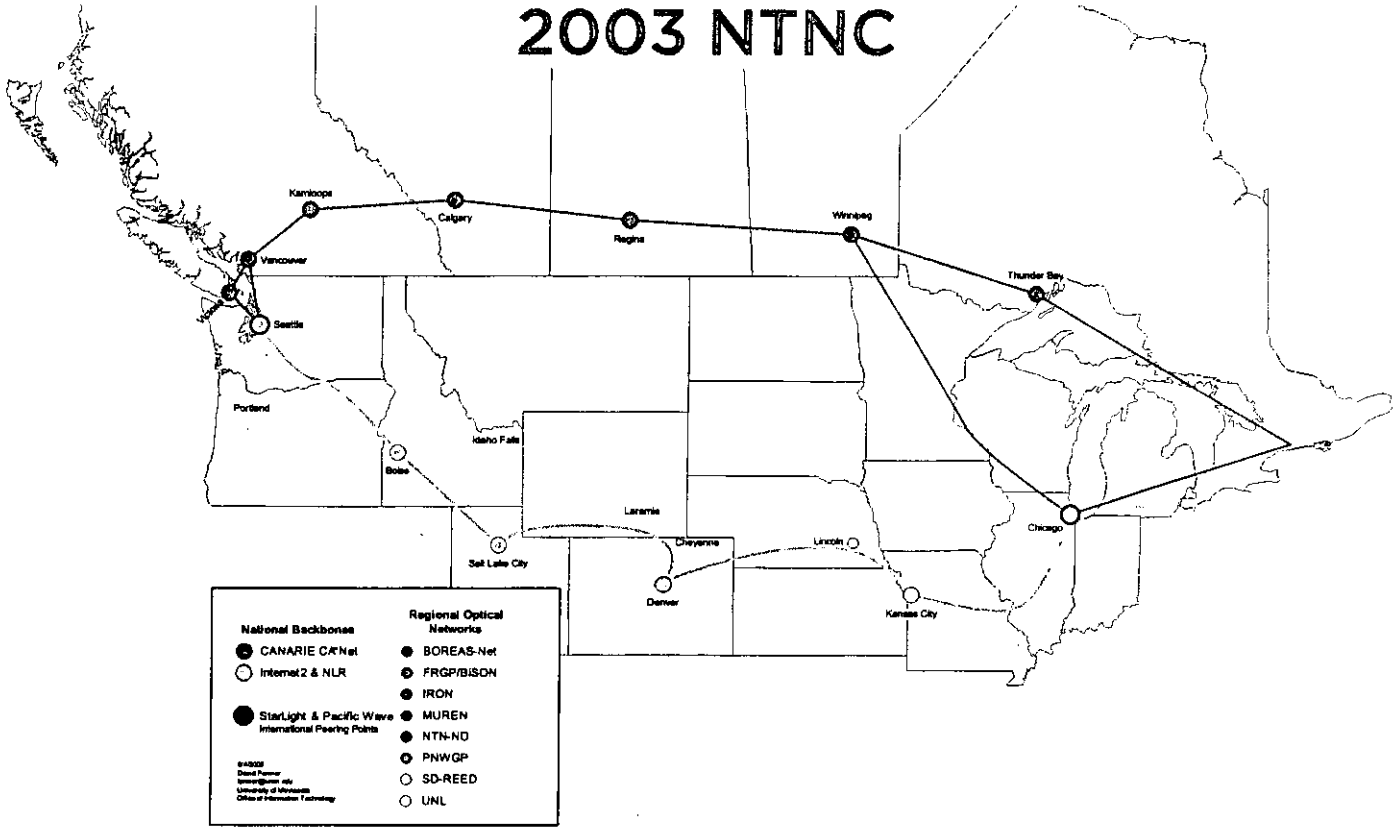
TRADITIONAL NETWORK TYPE/SPEED	NORTHERN TIER NETWORK (PER WAVE)
Dialup (56Kbps)	178,571 times faster
ISDN (128Kbps)	78,125 times faster
Entry DLS/Cable (1.5Mbps)	6,667 times faster
DSL/Cable (3Mbps)	3,333 times faster
Fast DSL/Cable (8Mbps)	1,250 times faster

- The NTN is designed to be part of the national and international R&E network fabric, such as Internet2, National Lambda Rail, CANARIE (Canada's R&E network), DREN (Defense R&E network), ESNET (Energy R&E network).
- The NTN provides future network technologies not generally available in today's commodity Internet, such as multicast, IPv6 and GENI (the building of the next Internet protocol).
- Fargo will become a crossroads connecting Chicago to Seattle and Winnipeg to Kansas City — connecting to all national and international R&E networks.
- NTN-ND supports economic development by enabling research and education that grows business and provides a high quality work force. It is being used to recruit scientists who develop tremendous amounts of data in their research and will be able to share it with colleagues globally.
- Research granting agencies (National Science Foundation, National Institutes of Health, Departments of Defense and Energy) are requiring increased collaboration between national and global high-performance computing facilities including those located at North Dakota State University and the University of North Dakota. These collaborations require network connectivity that NTN will provide.
- Without the bandwidth NTN provides, our higher education institutions could not participate in many of today's research grant opportunities.
- Historically, universities have led efforts to bring significant, cost-effective increases in bandwidth to the institutions they serve. This expanded connectivity has typically opened doors for the private sector to provide comparable services.

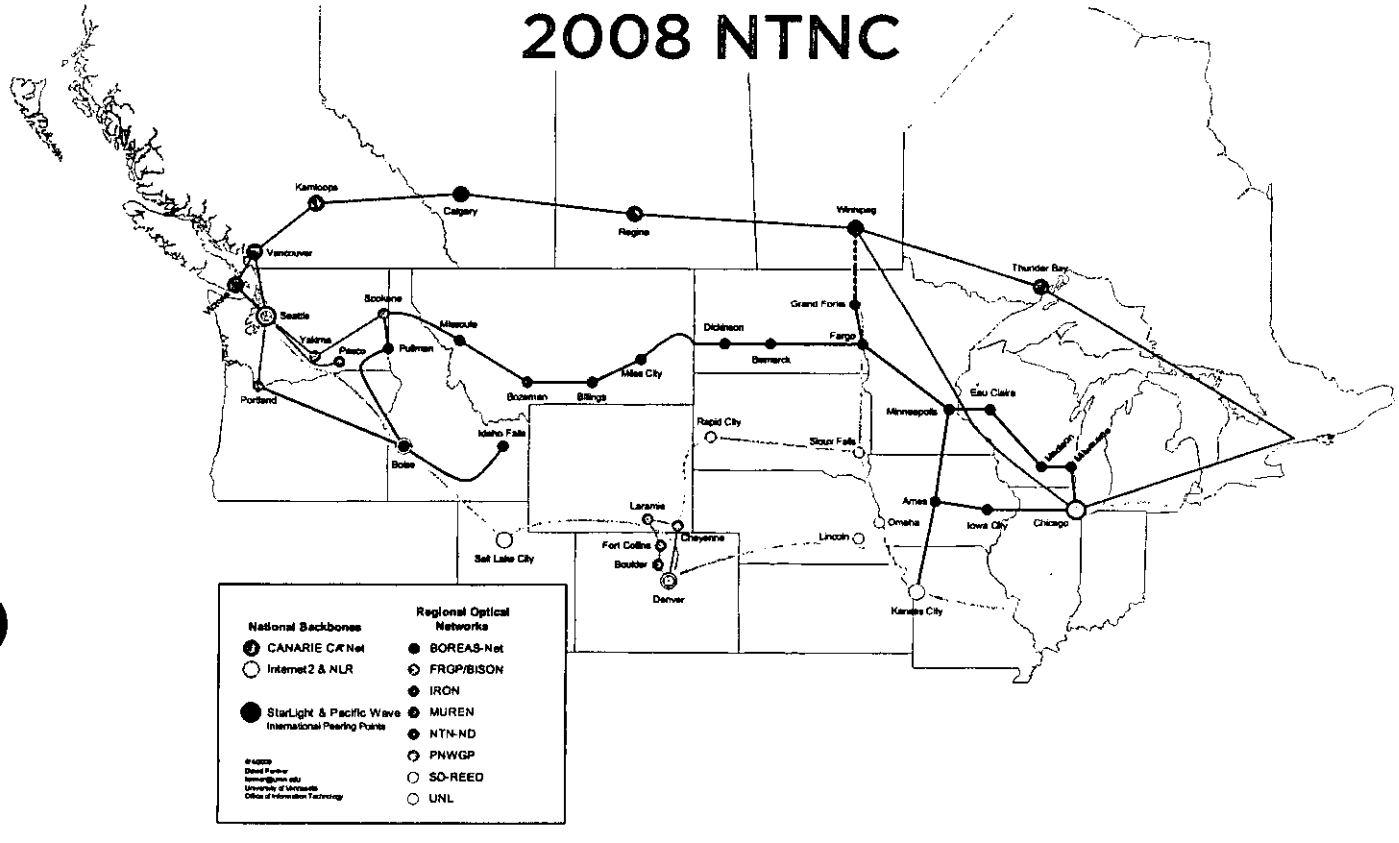
NTN is *not*:

- A high-speed network meant to meet the commodity Internet networking needs of the respective NTN states.
- A replacement for North Dakota's existing state backbone, StageNet.
- A new or ahead-of-its-time effort with regard to our peers.

2003 NTNC



2008 NTNC



Attachment 1
SCR 4003

62ND LEGISLATIVE ASSEMBLY

SCR 4003, Government and Veterans Affairs

Northern Tier Network—North Dakota

Marc Wallman

North Dakota State University

March 17, 2011

March 17, 2011

Madam Chairman and members of the Committee. For the record, I am Marc Wallman, Assistant Vice President for Enterprise Computing and Infrastructure at North Dakota State University. On behalf of the Northern Tier Network—North Dakota (NTN-ND) members from ND ITD, UND and NDSU, I thank you for giving us this opportunity to update you on the Northern Tier Network as well as to respond to questions you may have. Bonnie Neas, NDSU's VP for IT, who usually gives this report sends her regrets.

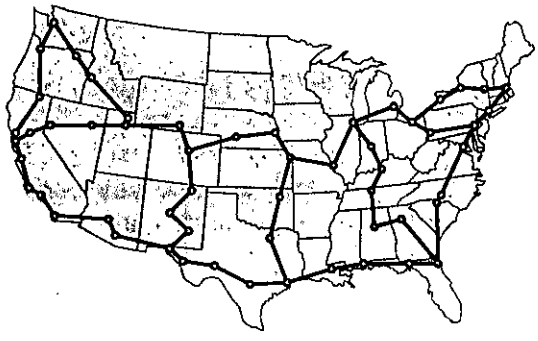


Figure 1: National Research and Education Network (Internet2) Circa 2003. Founding Northern Tier Member States Highlighted.

First, I would like to begin with some background information on the Northern Tier Network. The Northern Tier Network Consortium (NTNC) was established in 2003. The founding member states, highlighted on the map in Figure 1, wished to address the fact that the nation's research and education network had for years bypassed our region of the country. This lack of service to our region of our region **(1)** threatened to disenfranchise Northern Tier states from research activities, including competing for grant money, **(2)** to prevent participation in the future development of the country's research and education network, which supports local to global economic vitality.

Shortly after being founded, the NTNC received a grant from the National Science Foundation to fund an analysis of existing high capacity broadband options in the Northern Tier states as well as an analysis of the options available for deploying a dark fiber network in these states. Following the completion of the study in 2006, Northern Tier states were able to secure sufficient funding to establish an east-west connection between Seattle and Chicago. In 2007, the North Dakota Legislature committed $2,773,800 in startup funds for North Dakota's portion of this network that were added to $3.2 million of equipment contributed by the federal government via the Department of Defense.

The remainder of the report will consist of the following: **(1)** a review of how NTN-ND has met its initial goals, **(2)** a review of the FY07-09 report, **(3)** a review of the cost comparison requested by the Interim IT Council on October 14th, 2010, and **(4)** a snapshot of NTN-ND as it exists today.

The initial goals of the NTNC were to **(1)** ensure competitiveness for the region's research activities in support of its economic vitality, and **(2)** ensure our region's participation in the ongoing development of the nation's research and education network, which supports economic vitality. How have we done?

With regard to competitiveness in research activities, while we have certainly made important strides, I believe that we are only beginning to see the impact of the Northern Tier Network. Computational research is a growing field at UND and NDSU and the demands we see today are expected to significantly expand in the future. In the Fall of 2010, Dr. Svetlana Kilina, a computational chemist at Los Alamos National Lab, joined the faculty at NDSU. She brought with her a substantial amount of data from her previous research activities. NTN-ND reduced the time to transfer her research data from what would have been a few days before NTN-ND down to a couple of hours. This ability to quickly transfer large data sets will provide Dr. Kilina with future opportunities to share her work with potential collaborators.

The economic impacts of research activities often take time before they are fully realized. We expect NTN-ND to enable research that will contribute to our states economic vitality. In the meantime, NTN-ND has created an immediate economic impact by driving demand for high performance network capacity. Upgrades to STAGEnet metro connections have already taken place in Fargo as a result of NTN-ND. Work on NTN-ND interconnects in Bismarck is almost complete. We expect this demand not only continue, but to increase with time.

With regard to ensuring our region's participation in the ongoing development of the nation's research and education network, NTN-ND has been an unqualified success. In July of 2010, the National Telecommunications and Information Administration (NTIA) awarded Internet2 $62.5 million in funding to deploy singificant enhancements to the nation's research and education network. The NTNC was a partner in this grant submission and will play a key role in the networks deployment and ongoing operation. Further, this partnership will provide NTN-ND with improved service and reduce operating costs by approximately $300,000 per biennium. NTN-ND is now, literally, on the map.

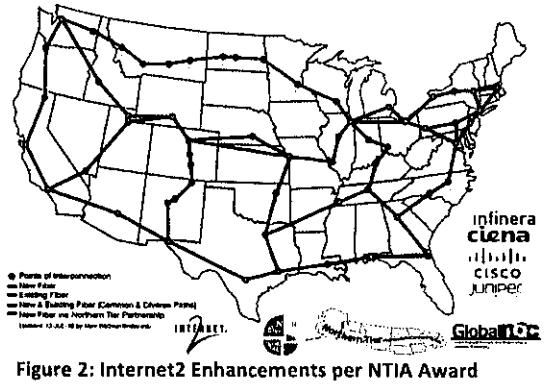


Figure 2: Internet2 Enhancements per NTIA Award

In January of 2009, NTN-ND submitted a preliminary report to the legislature, outlining activities and progress made during the 07-09 bienium. This report, along with an addendum detailing accomplishments between January 2009 and June 30, 2009 has been distributed with a copy of my testimony. Of the materials provided in this report, there are two items I would like to highlight. First is a map showing the relationship of NTN-ND to STAGEnet, the state network operated by ND ITD. The map I have included as part of my testimony is derrived from one in the 07-09 report. It shows the routes for both the STAGEnet backbone and NTN-ND. Also included in this map is the South Dakota interconnect, which was funded by an NSF grant, jointly awarded to North Dakota and South Dakota in 2010. Returning to the relationship between STAGEnet and NTN-ND, there are several remarks I would like to make. First, the map in Figure 3 shows both STAGEnet and NTN-ND backbones. For NTN-ND, this is the whole story. It is only a backbone. STAGEnet is much more. It connects government and educational institutions across the state. There are many regional and local network links that are not pictured in this diagram. NTN-ND is part of a national backbone-only network. It does not and will not provide connectivity beyond points-of-presence indicated by the green dots on the map in Figure 3. North Dakota telecommunications companies have played and will continue to play a vital role in North Dakota's abilty to use NTN-ND.

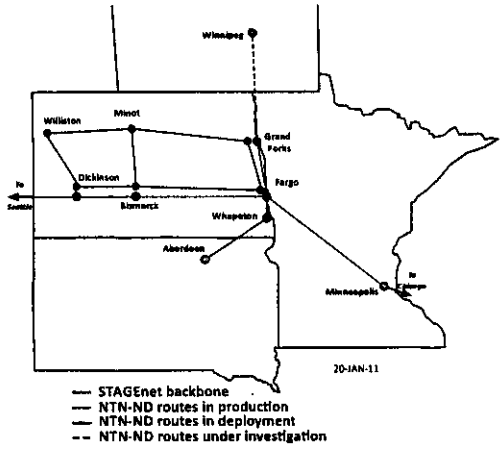


Figure 3: NTN-ND and STAGEnet

The second item that I would like to highlight from this report is the FY08 and FY09 expenditures. I have included charts illustrating FY08 and FY09 expenditures with my testimony. Most of the expenditures in 07-09 came in FY09. That year saw the transition from deployment to production. Expenses during this year included both deployment and operating costs. They were primarily for hardware and telecommunications services. No additional positions have been created at ND ITD, UND, or NDSU with NTN-ND money.

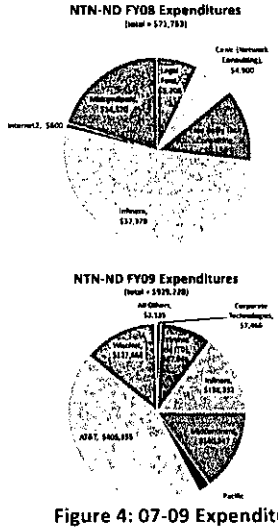


Figure 4: 07-09 Expenditures

At the October 14th, 2010 meeting of the Legislature's Information Technology Committee, there was a request that NTN-ND estimate the cost to acquire equivalent services, if the existing network were not funded. A report has been included with my testimony with this estimate. The report provides a cost comparison with a services bid submitted for an RFI in 2007. It was compared with NTN-ND annual operating costs as submitted to the State Board of Higher Education for inclusion in the University System's appropriation request for this session. This particular cost comparison suggests a tenfold increase would be required to purchase equivalent services to what currently exists in NTN-ND.

Finally, I would like to conclude with a few remarks on the current state of NTN-ND. In October 2010, Bonnie Neas submitted testimony to the Information Technology Committee that included new developments. These include the Internet2 NTIA grant, the NSF grant to connect North and South Dakota, and an NSF award to NTN-ND and the University of Washington to improve network services between Seattle and Chicago. We continue to make progress on these initiatives and expect to have substantial completion on them within 18 months.

NTN-ND Cost Comparison

Prepared January 4, 2011

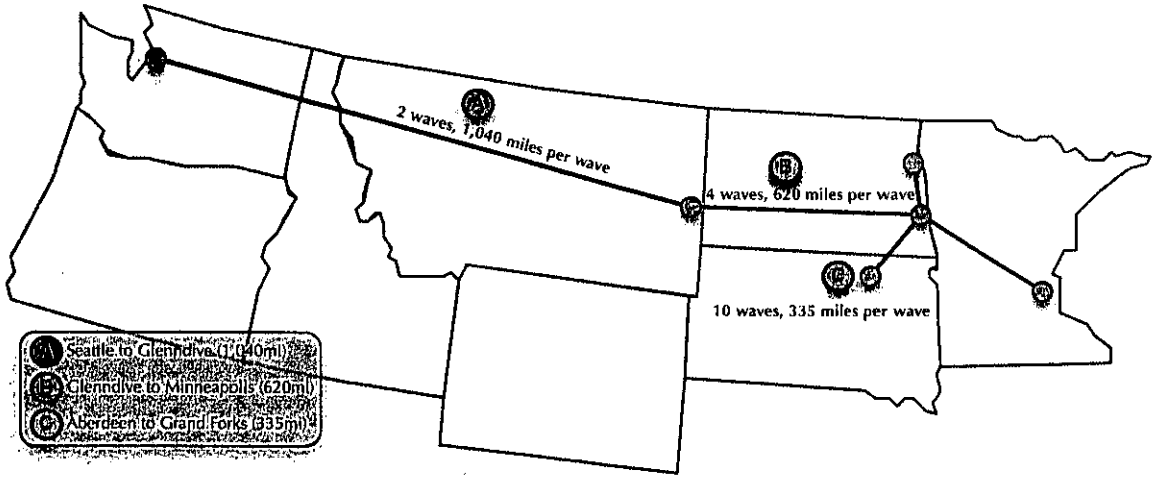
This report is provided at the request of the North Dakota Legislature's Information Technology Committee. As reflected in the minutes of the October 14, 2010 committee meeting in Bismarck, there was discussion of the possible effects of NTN-ND not receiving ongoing funding. As part of this discussion, Ms. Bonnie Neas, Vice President for Information Technology at North Dakota State University, offered to provide a report estimating costs that would be incurred by the North Dakota University System to purchase services equivalent to existing NTN-ND services.

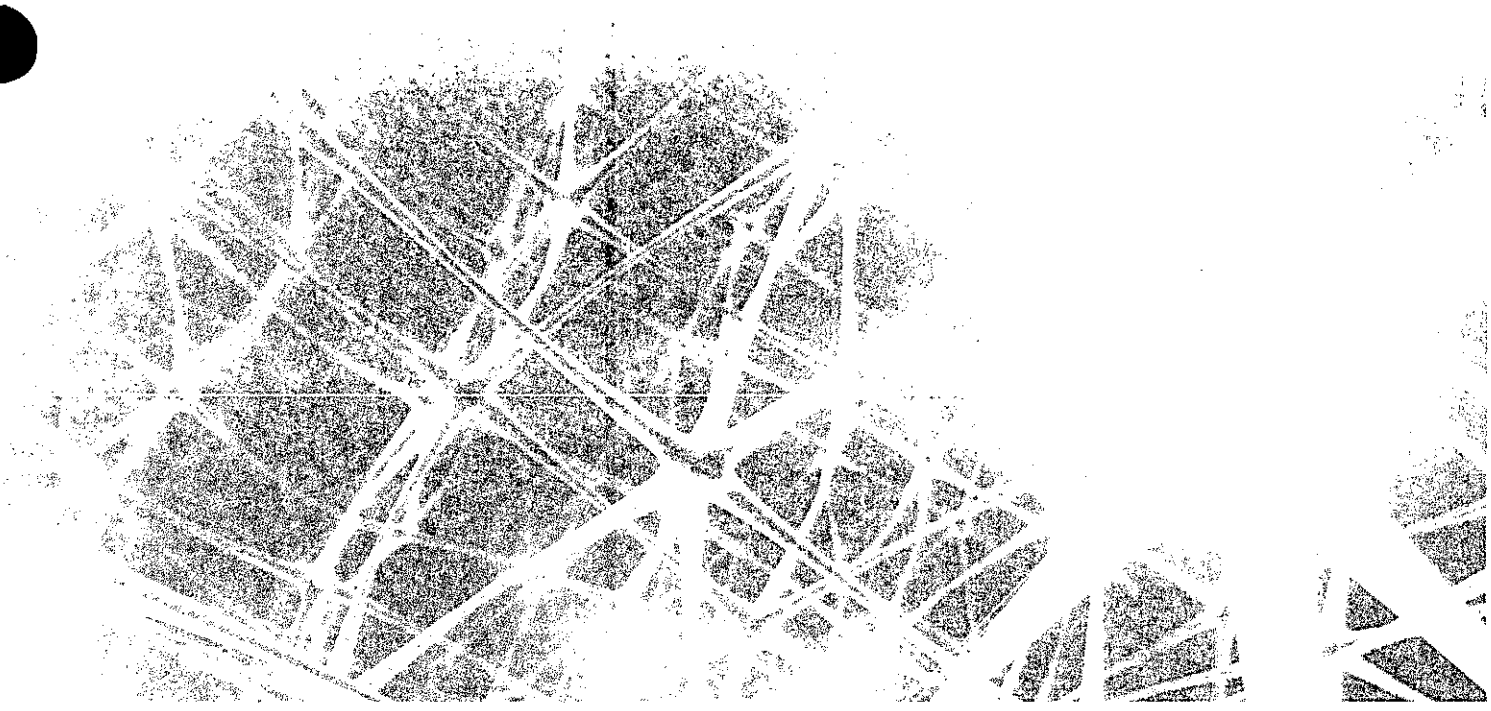
This report provides an estimate of what would be required by the North Dakota University System to purchase services equivalent to what NTN-ND offers. The table below compares current NTN-ND operating costs as of Fall 2010, to a vendor response to an RFI for dark fiber between Fargo and Grand Forks. While the RFI was for dark fiber between Fargo and Grand Forks, one vendor provided a services based response. While dated, this was the most reliable cost data that was available.

Solution	Cost per wave mile	Wave Miles	Annual Cost
Current NTN-ND w/o Internet2 Partnership	$ 118	7,910	$ 935,700
Current NTN-ND with Internet2 Partnership	$ 99	7,910	$ 786,100
Services Model (2007 RFI Response)	$ 1,239	7,910	$9,800,490

Method of Comparison

In order to make a more accurate comparison, the costs from the 2007 vendor response were converted to the cost of one mile of a 10Gb data wave (i.e., a one 10Gbps data link). This figure was then used to calculate the cost equivalent of purchasing 7,910 miles of 10Gb links (i.e., purchasing services that are equivalent to what NTN-ND currently offers). Current NTN-ND services are also shown in the diagram below.





07-09
BIENNIAL REPORT

Northern Tier Network

North Dakota State University,
University of North Dakota and
North Dakota Information Technology Department

PARTNERS

Pacific Northwest GigaPOP (PNWGP)‡
AT&T Fiber Broker, Network Engineering
www.pnwgp.net

The University of Washington
Operator of PNWGP
www.washington.edu

BOREAS-Net‡
Eastward Transport Network
www.boreas.net

Northern Lights GigaPOP‡
Internet2 Data Service Provider
www.northernlights.gigapop.net

[illegible]net‡
Network Operations Center
www.wiscnet.net

CENIC‡
Consulting
www.cenic.org

Eide Bailly
Consulting
www.eidebailly.com

Qwest
Infinera Equipment Reseller
www.qwest.com

Midcontinent Communications (MidCo)
Dark Fiber (North-South) and Related Services
www.midcocomm.com

The Defense Research and Engineering Network (DREN)
Federal Funding Agency
www.hpcmo.hpc.mil/Htdocs/DREN

AT&T
Dark Fiber (East-West) and Related Services
www.att.com

IdeaOne
Fargo Local Loop
www.ideaone.com

The Northern Tier Network Consortium‡
Regional Research and Education Network Consortium
www.ntnc.org

Montana University System
Westward Transport Network
www.mus.edu

‡ Denotes institutions affiliated with higher education.

> FORWARD Thank you to Gov. John Hoeven, the North Dakota Legislature and Sen. Byron Dorgan for your financial support, without which this endeavor would not have been possible.

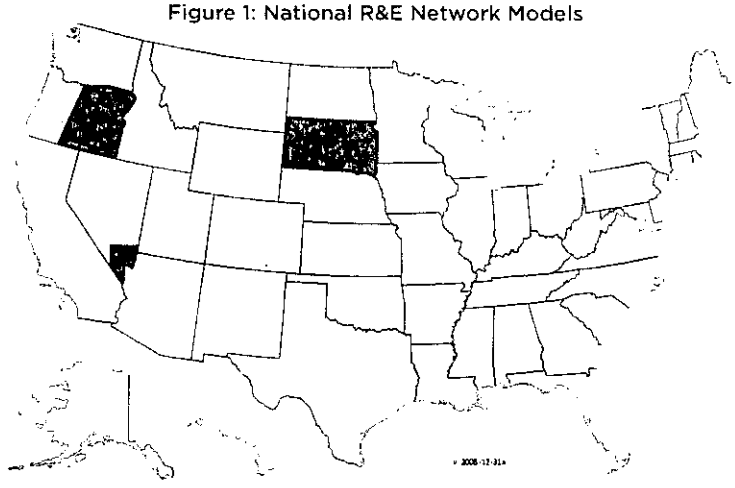
The Northern Tier Network Consortium (NTNC)

BACKGROUND

Efforts to provide connectivity to the nation's high-speed research and education network backbone for universities in North Dakota and other states in the upper Midwest have been under way since the mid-1990s. This was in response to the lack of competitiveness in the region's advanced networking capabilities in support of the educational, research and economic vitality of the Northern Tier region. The Northern Tier Network Consortium (NTNC) was established in 2003 primarily by higher education representatives from seven states — today the membership represents 12 states.

This regional network initiative is an attempt to provide a robust research network connection for educational institutions and federal research laboratories in upper-Northwestern states by creating a national backbone route across the Northern Tier states between Chicago to the east and Seattle to the west. Northern Tier Network Consortium state members include Michigan, Wisconsin, Minnesota, North Dakota, South Dakota, Nebraska, Montana, Idaho, Wyoming, Washington and Alaska.

Figure 1: National R&E Network Models



- Dark fiber R&E network (existing or in deployment)
- Planning under way for dark fiber R&E network
- Telco provided data services R&E network
- ATM R&E network

Great strides have been made both in our region and nationally to strengthen and expand this resource that is so critical to our global competitiveness. Most of our nation is served now by a research and education network like the one being deployed in North Dakota (see Figure 1). As of 2006, more than 35,000 route-miles of dark fiber were held by U.S. research universities.[1] Northern Tier connects to the U.S. Internet2 (www.internet2.edu)[2] and National Lambda Rail (www.nlr.net)[3] networks and other international research and education networks at points in Chicago and Seattle. Without Northern Tier connections to these networks, other regions surpassed this region's network capacity by a factor of 10 or more.

North Dakota's serious efforts in deploying its share of the Northern Tier Network began in 2005 when a $200,000 planning grant was acquired by North Dakota, South Dakota, Montana and Idaho. This grant funded a consultant who developed a network-engineering plan that provided the basis for the Northern Tier Network footprint across these four states. As a follow-up to this planning effort, in September 2006, Sen. Byron Dorgan secured $3.25 million in seed money for NDSU to be used in consultation with University of North Dakota and the state's Information Technology Department for North Dakota's Northern Tier Network project. Gov. Hoeven followed suit by including the remainder of the required funding in his FY08-FY09 budget.

In spring 2007, the North Dakota Legislature offered its endorsement in the form of a $2.73 million appropriation. To manage this joint project, UND, ITD and NDSU entered into a three-party agreement, with NDSU acting as the fiscal agent and primary point of contact for Northern Tier Network issues. This group and the Northern Tier Network segments the group is responsible for have been dubbed Northern Tier Network-North Dakota (NTN-ND).

[1] [illegible]ww.es.net/oac/seminars/20060529/pr/preston.pdf.

[2] Internet2 promotes the missions of its members (200 higher education institutions) by providing both leading-edge network capabilities and unique partnership opportunities. It links member campuses and laboratories with a broader community which includes U.S. government and commercial research laboratories and research and education networking organizations in countries around the world.

[3] National Lambda Rail is a research-focused network owned and operated by the U.S. research community. [illegible] infrastructure for leading-edge network research, universities and national labs.

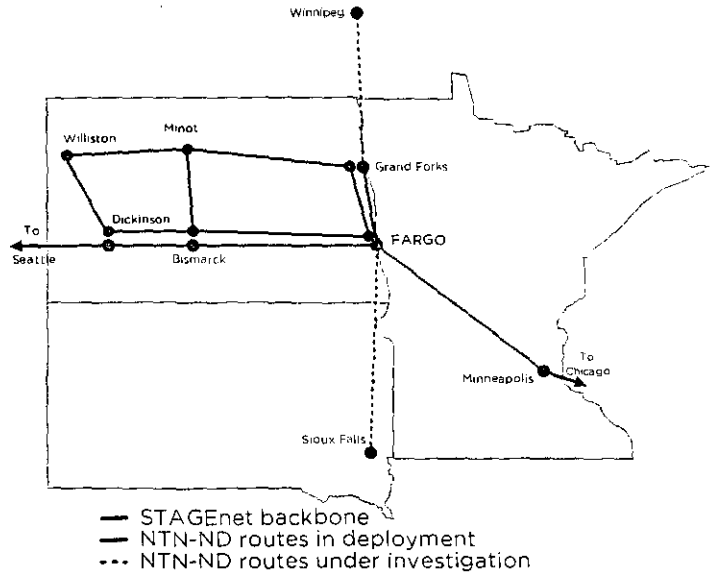
PROGRESS TO DATE

Significant progress has been made to date on deployment of NTN-ND. The base NTN-ND deployment is well under way. The network is expected to have a point-of-presence (POP) in the cities of Dickinson, Bismarck, Fargo, and Grand Forks by Q1 2009 (see Figure 2). Connections from NDSU and UND to their respective local POPs also should be completed by Q1 2009. ITD and the North Dakota University System currently are working with local telecommunications companies to establish POP links in Dickinson and Bismarck, but these connections are unlikely to go live until sometime after Q1 2009.

In an effort to clarify the relationship between STAGEnet and NTN-ND, it should be noted that NTN-ND is a backbone-only network. It does not and will not provide connectivity beyond the points-of-presence in the cities noted by orange dots in Figure 2. When up and operational, NTN-ND will take the place of the North Dakota University System's current Internet2 transport link. This link with connectivity from Fargo to Minneapolis has been in place since 2000. Prior to that, Internet2 research transport was accommodated by the Great Plains Network with a link from Fargo to Kansas City (1997-2000).

Institutions not directly connected to a NTN-ND POP, such as the remaining North Dakota University System institutions, will need to have their Internet2-bound data — destined for out-of state locations — transported over STAGEnet to the nearest NTN-ND POP.

Figure 2: NTN-ND and STAGEnet backbone routes



While much has been done, everything is not complete. NTN-ND is investigating two additional partnerships, one with CANARIE (Canada's national research network) and the other with the South Dakota University System. We expect to have sufficient startup money to choose one of these two routes and hope to find sufficient funds to cover ongoing expenses. (These routes are diagramed in Figure 2). Negotiations are currently under way with both parties. When complete, North Dakota will serve as an upper Midwest crossroads for national and international research and education high-speed Internet traffic.

USE AND RESTRICTIONS

As previously noted, NTN-ND will replace the North Dakota University System's current Internet2 transport link when it becomes operational. The initial deployment will be 10 10Gbps circuits, scalable to 40 10Gbps circuits. Peering agreements with Montana and Washington will allow for shared use of the initial 10 circuits.

Even though the North Dakota University System will abide by existing language passed during the 60th Legislative Session - NDCC § 15-10-45 - we continue to believe this language is ambiguous and unnecessary since paragraphs 14-16 in NDCC § 54-59-05 already prevent state competition with private companies. Further, NTN-ND has agreements in place with AT&T and Midcontinent Communications (see Appendix A). Those agreements include non-compete clauses, which prevent the kind of activities NDCC § 15-10-45 is concerned with.

EXPENDITURES

NTN-ND has two primary sources of funding. The first is $3.25 million secured by Sen. Byron Dorgan through the Defense Research and Engineering Network (DREN), which falls under the Department of Defense. The second source of funding is $2.73 million in state funds appropriated during the 2007 legislative session. Both of these funding sources represent one-time funds. NTN-ND is currently working with ongoing funding and expects to need $1 million annually starting in FY11 (July 1, 2010) in order to operate the full network.

Federal funding was used exclusively to purchase equipment (see Figure 3). Department of Defense – Defense Research and Engineering Network (DREN) acquired this equipment based on NTN-ND specifications and is in the process of completing the necessary paperwork to transfer ownership to NTN-ND. Equipment was purchased from Cisco Systems and from Qwest for Infinera.

NTN-ND expenditures can be grouped into four main categories:

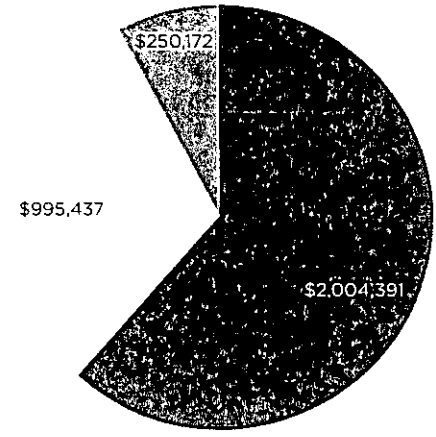
- Fiber optic cable
- Equipment
- Consulting
- Operating

Expenditures on fiber include IRU (indefeasible right of use) agreements, operating and maintenance fees, and fees for rack space and power in communications huts. Certifying the fiber and associated installation fees for the route running from the Montana-North Dakota border to Minneapolis (see Figure 4) were paid to AT&T and facilitated by PNWGP. This fiber was provided to Washington, Idaho, Montana, North Dakota, Minnesota and Wisconsin by the Pacific Northwest GigaPOP (PNWGP).[4] This fiber was available to North Dakota at no cost via PNWGP, and, therefore, was not competitively bid. Sole-source acquisition paperwork for this fiber was filed at NDSU.

Fiber optic cable from Grand Forks to Fargo did go through a competitive bidding process, which was overseen by NDSU's Purchasing Department and General Counsel, with additional legal counsel from Caplan and Earnest LLC, a Denver firm. This bid was awarded to Midcontinent Communications and includes options to acquire additional fiber north to Canada and south to Sioux Falls. NTN-ND still is investigating the feasibility of these routes and associated partnerships.

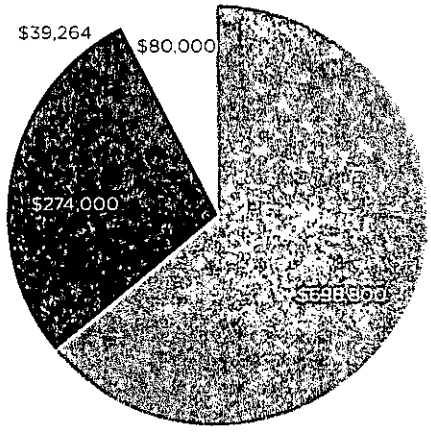
While federal funding provided the vast majority of the equipment necessary for NTN-ND, it did not cover 100 percent of our equipment needs. The remaining required equipment was Infinera equipment and was purchased with state funds. The pricing was based on a competitive bidding process conducted by BOREAS-Net, a regional networking consortium composed of the University of Minnesota, University of Wisconsin-Madison, University of Iowa and Iowa State University, all Northern Tier Network Consortium members.

Figure 3: Federal Expenditures



NTN-ND Federal One-Time Equipment Expenditures
Federal Overhead Cisco Qwest/Infinera

Figure 4: State Funded Startup Expenditures



Expenditures by Category
MT-ND border to Minneapolis; Fargo to Grand Forks
Fiber Equipment Consulting Operating

Figure 5: State Funded Startup Expenditures

Expenditures by Industry
MT-ND border to Minneapolis; Fargo to Grand Forks
Telecommunications Consulting Higher Education

[4] This fiber is part of a larger effort by AT&T and the Southeast University Research Association (SURA) to promote dark fiber ownership by research universities. Approximately 6,000 route miles of AT&T fiber throughout the nation were made available through an agreement between these two entities.

Operating fees associated with our startup expenditures are primarily for network operations. An external vendor was sought to provide operational oversight of NTN-ND. This includes services such as network configuration changes, monitoring and troubleshooting. WiscNet was selected to provide NTN-ND Network Operations Center (NOC) services through a competitive bidding process. (WiscNet also provides NOC services to BOREAS-Net.)

Finally, some consulting services were required during implementation. Services included network engineering (PNWGP), planning and budgeting (CENIC), and project management for our competitive bids (CENIC and Eide Bailly).

The various industries benefiting from state and federal NTN-ND funds are shown in Figure 5 on page 3.

As part of its fiscal planning efforts, NTN-ND has built an annual budget based on costs that it currently is committed to. These costs are preliminary, since the operating expenses for extending NTN north toward Canada or south to South Dakota have not been calculated. There are currently insufficient implementation details to make reliable cost estimates for connections to Canada or to South Dakota.

The categories for projected annual expenditures are analogous to the startup costs (see Figure 6). Expenditures are projected for operating, fiber, depreciation and maintenance. Operating expenses are primarily for NOC services. Fiber expenditures are composed of operating and maintenance fees, as well as rack and power fees paid to AT&T and MidContinent Communications. Depreciation represents the amount of money that needs to be set aside annually in order to replace equipment purchased during startup when it reaches end-of-life. Maintenance fees are ongoing fees paid to equipment vendors for ongoing support, part replacement and software upgrades.

The industries receiving financial benefit from the ongoing operation of NTN-ND are higher education and telecommunications. The dollar amounts for each of these sectors are shown in Figure 7.

Figure 6: Projected Annual Expenditures by Category

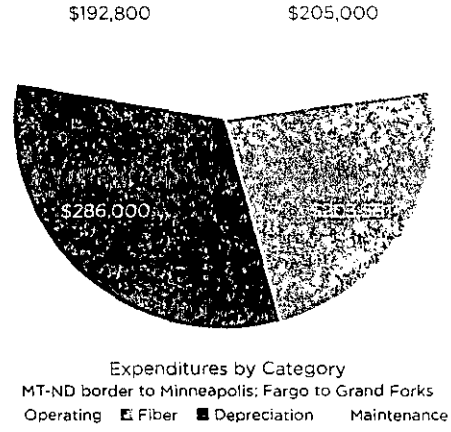
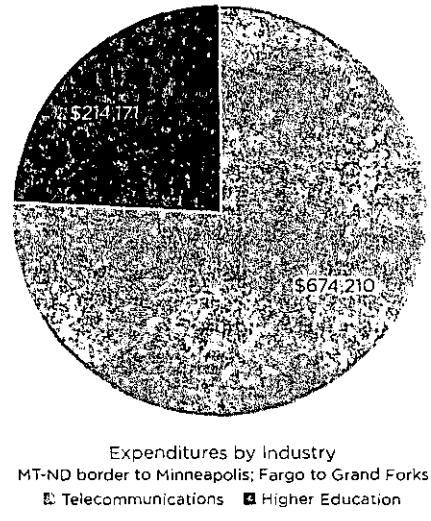


Figure 7: Projected Annual Expenditures by Industry



Appendix A

Use Restrictions in the North Dakota Century Code, AT&T IRU, and Midcontinent Communications IRU

§ 15-10-45 Telecommunications and information services competition prohibited.

1. The Northern Tier Network, part of a national research network infrastructure, serves entities within and outside this state. The North Dakota University System may use the Northern Tier Network infrastructure only for the purpose of supporting the research and education missions of the North Dakota University System. The North Dakota University System may not use the Northern Tier Network infrastructure for traditional Internet, voice, video or other telecommunications services beyond those required for research networks.
2. The North Dakota University System or any entity associated with the university system may not resell any portion of the Northern Tier Network infrastructure to nonuniversity entities other than research collaborators.
3. The Northern Tier Network may not replace any wide area network services to any city, county or school district which are provided by the information technology department under section 54-59-08.

The North Dakota University System shall provide a comprehensive biennial report of Northern Tier Network activities for the 2007-09 biennium and must submit to a biennial audit of the Northern Tier Network activities beginning with the 2009-11 biennium.

§ 54-59-05 Powers and duties of department. The department:

14. May provide wide area network services to a state agency, city, county, school district or other political subdivision of this state. The information technology department may not provide wide area network service to any private, charitable or nonprofit entity except the information technology department may continue to provide the wide area network service the department provided to the private, charitable and nonprofit entities receiving services from the department on January 1, 2003. The department shall file with the state auditor before September 1, 2003, a description of the wide area network service the department provided to each private, charitable and nonprofit entity receiving services from the department on January 1, 2003.
15. Shall assure proper measures for security, firewalls and Internet protocol addressing at the state's interface with other facilities.
16. Notwithstanding subsection 14, may provide wide area network services for a period not to exceed four years to an occupant of a technology park associated with an institution of higher education or to a business.

§ 54-59-08. Required use of wide area network services. Each state agency and institution that desires access to wide area network services and each county, city and school district that desires access to wide area network services to transmit voice, data or video outside that county, city or school district shall obtain those services from the department. The chief information officer may exempt from the application of this section a county, city or school district that demonstrates its current wide area network services are more cost-effective for or more appropriate for the specific needs of that county, city or school district than wide area network services available from the department. The chief information officer shall exempt from the application of this section a county, city or school district that is under contract to receive wide area network services from an entity other than the department, for the term of that contract, but that political subdivision may not extend or renew that contract beyond July 31, 2001.

AT&T Contractual Restrictions

"Notwithstanding anything to the contrary in the Collaboration Agreement or elsewhere, SURA and Licensee may allow any for-profit entity that complies with Section 2.1.1.3 of the Collaboration Agreement, as amended, to use the SURA Strands, provided that such entity's use is for scientific and clinical research, technology development and educational purposes. Any other use shall be solely through Section 3.3 of the Collaboration Agreement, if at all, and shall be subject to prior written approval by AT&T."

Midcontinent Contractual Restrictions

Subject to the provisions of this agreement, the university may use the university fibers and the IRU for any lawful research, governmental, educational or other non-commercial purpose. In addition, the parties agree that such use includes providing access to parties who are leasing property in the university's technology park as well as commercial entities who are conducting research under an agreement with the university.

Northern Tier Network 2009 Legislative Report Addendum

In January 2009, North Dakota State University, the University of North Dakota, and the North Dakota Information Technology Department submitted a report with year-to-date information on the 2007-09 biennium. This addendum to the 2009 legislative report details developments that occurred between Jan. 1 and June 30, 2009, and provides information on expenditures for the 2007-09 biennium.

ACTIVITIES (JAN. 1 TO JUNE 30, 2009)

Most of the activity that occurred in the 2007-09 biennium occurred before Jan. 1, 2009. The only significant event that occurred after Jan. 1, 2009, came in April when the North Dakota portion of the Northern Tier Network went into production. At this time, the North Dakota University System's connection to Internet2 (www.internet2.edu) was increased by more than a factor of 50.

ACTUAL EXPENDITURES (2007-09 BIENNIUM)

Expenditures during the 2007-09 biennium consisted entirely of services and equipment. No money was spent on staff or internal services at NDSU, UND or IT. The bulk of expenditures went to telecommunications service providers and hardware vendors. Table 1 shows FY08 and FY09 expenditures using ConnectND expense categories.

Table 1: NTN-ND FY08/FY09 Expenditures by ConnectND Category

EXPENSE#	EXPENSE DESCRIPTION	FY08	FY09
521000	Travel	$ —	$ —
531000	Data Processing	$3,000	$51,761
533000	Food and Clothing	$ —	$ —
535000	Supplies	$ —	$ —
536000	Office Supplies	$ —	$ —
541000	Post Office/Postage	$ —	$ —
542000	Printing	$ —	$624
551000	IT Equipment Under $5,000	$ —	$ —
591000	Repairs	$ —	$21,261
571000	Insurance	$ —	$ —
602000	Telephone	$ —	$856
611000	Professional Development	$600	$1,200
621000	Operating Fees	$14,520	$833,526
623000	Non-Employee Expenses	$19,264	$20,000
693000	Equipment Over $5,000	$34,379	$ —
TOTAL		$71,763	$929,228

Unfortunately, these categories do not offer a sufficiently clear [redacted]ture of how NTN-ND funds have been spent during the [redacted]-09 biennium. To paint a better picture, expenditures by [redacted]dor are aggregated in Figures 1 and 2.

In FY08, NTN-ND was still early in deployment. Slightly more than 25 percent of expenditures were for consulting services (legal, network and RFI management) needed to launch the network. More than 50 percent of the expenditures were on hardware required to operate the network. Total expenditures during FY08 were low overall, totaling just $71,763.

By FY09, NTN-ND deployment was in full swing with approximately 75 percent of expenditures going to telecommunications service providers (AT&T, Midcontinent Communications and WiscNet). Slightly less than 25 percent of expenditures went to hardware vendors (Corporate Technologies, Extreme Networks and Infinera). Network Engineering services from the Pacific Northwest GigaPOP accounted for $20,000 in expenditures. Overall expenditures for FY09 totaled just under $930,000.

During the 2007-09 biennium, NTN-ND partners agreed not to set aside funds for budgeted hardware replacement. The original NTN budget approved by the 2007 Legislature had $286,000/year reserved for capital refresh. When it was apparent that NTN-ND was not going to receive on-going funds during the [redacted]9 Legislative session, NTN-ND partners decided to use capital [redacted]ves to pay ongoing operating costs. During FY08, it also became apparent that our partners in Canada and South Dakota were not ready to share in the costs of extending NTN to their regions. Therefore, to preserve additional funds for on-going operations, NTN-ND decided that grants would be pursued in order to complete the North segment from Grand Forks (UND) to Canada's Advanced Research and Innovation Network (CANARIE) in Winnipeg, and the South segment from Fargo (NDSU) to a point on South Dakota's Research Education and Economic Development (REED) network.

Figure 1: NTN-ND FY08 Expenditures

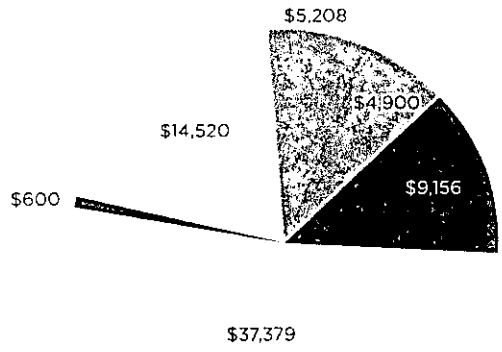
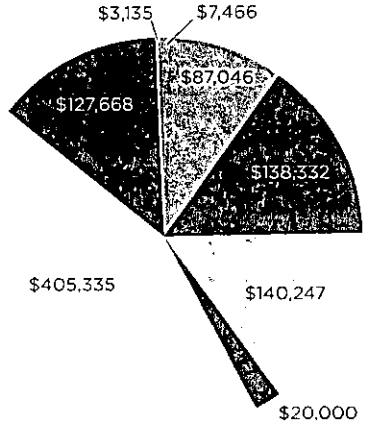
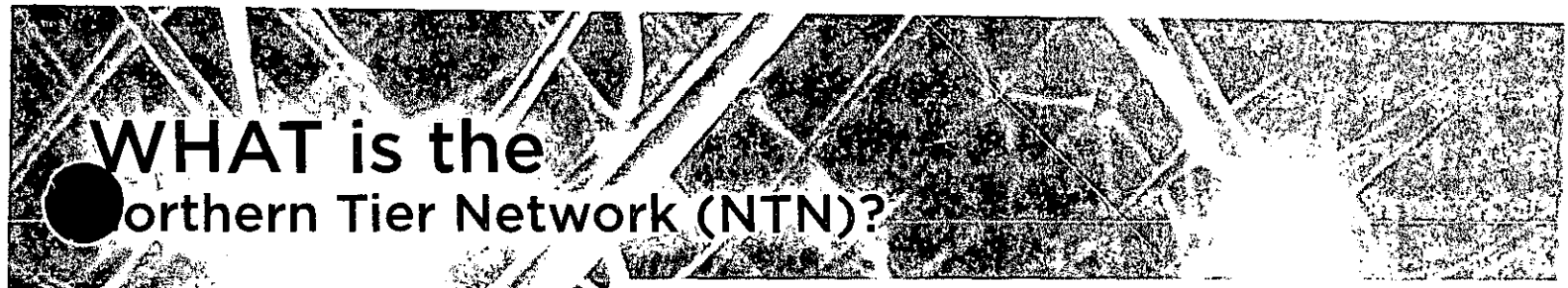


Figure 2: NTN-ND FY09 Expenditures



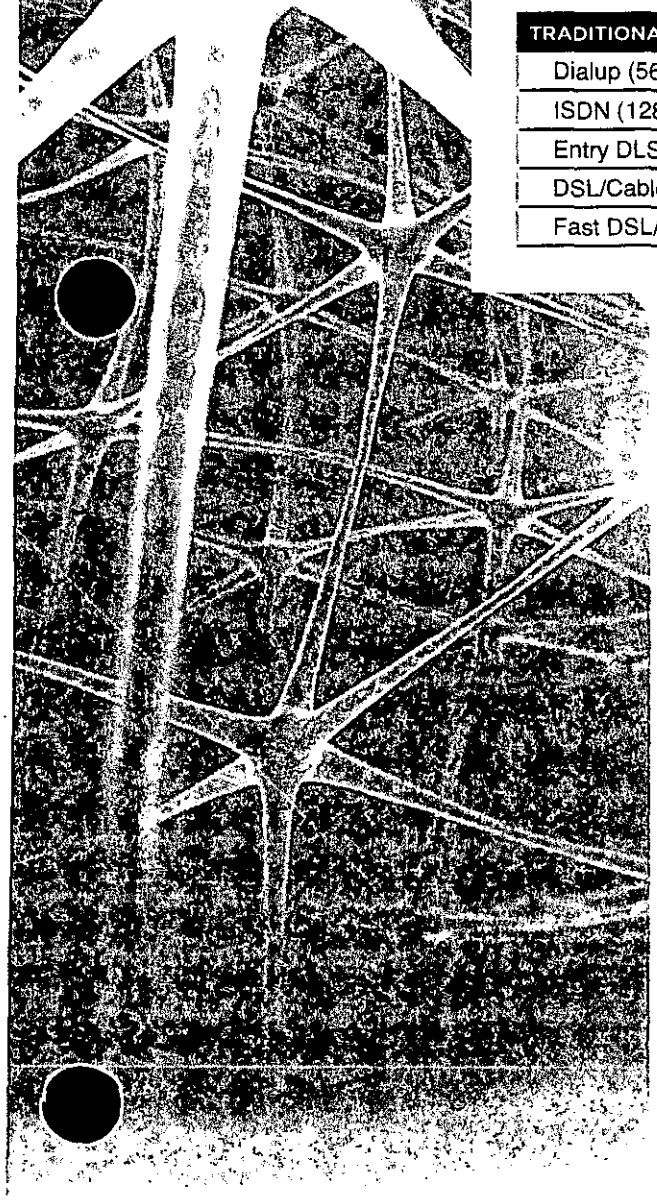
WHAT is the Northern Tier Network (NTN)?



NTN is an ultra high-speed regional network with multiple optical waves capable of transferring about 10 gigabits of information per second per wave.

- NTN supports the research and education mission of its members.
- The NTN region includes 12 Northwest states: Alaska, Idaho, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, South Dakota, Washington, Wisconsin and Wyoming.
- NTN-ND is North Dakota's NTN segment. Each NTN state is responsible for the development and on-going support of its NTN segment with agreements for rights-to-use on other segments. See map on the next page; NTN-ND is the red segment.

TRADITIONAL NETWORK TYPE/SPEED	NORTHERN TIER NETWORK (PER WAVE)
Dialup (56Kbps)	178,571 times faster
ISDN (128Kbps)	78,125 times faster
Entry DLS/Cable (1.5Mbps)	6,667 times faster
DSL/Cable (3Mbps)	3,333 times faster
Fast DSL/Cable (8Mbps)	1,250 times faster

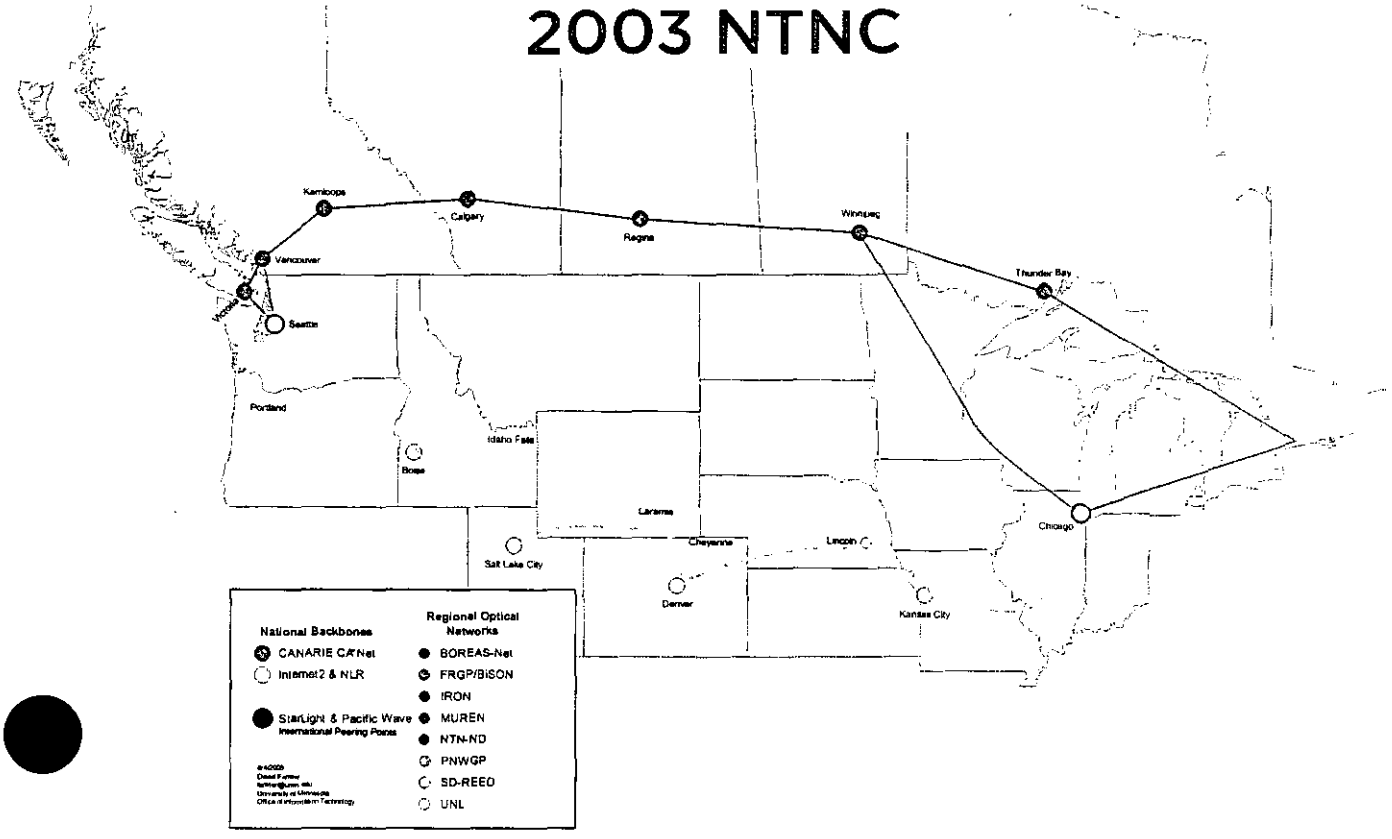
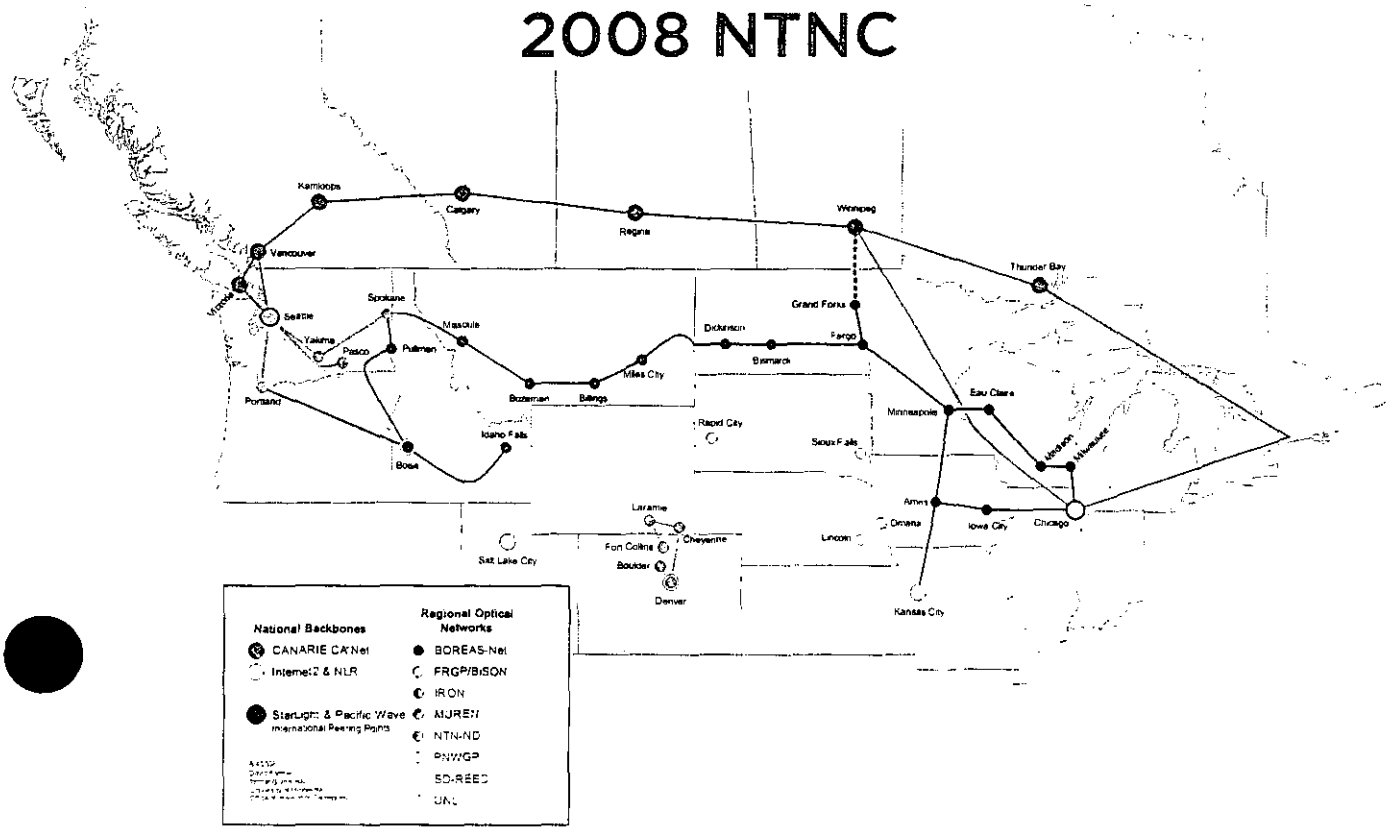


- The NTN is designed to be part of the national and international R&E network fabric, such as Internet2, National Lambda Rail, CANARIE (Canada's R&E network), DREN (Defense R&E network), ESNET (Energy R&E network).
- The NTN provides future network technologies not generally available in today's commodity Internet, such as multicast, IPv6 and GENI (the building of the next Internet protocol).
- Fargo will become a crossroads connecting Chicago to Seattle and Winnipeg to Kansas City — connecting to all national and international R&E networks.
- NTN-ND supports economic development by enabling research and education that grows business and provides a high quality work force. It is being used to recruit scientists who develop tremendous amounts of data in their research and will be able to share it with colleagues globally.
- Research granting agencies (National Science Foundation, National Institutes of Health, Departments of Defense and Energy) are requiring increased collaboration between national and global high-performance computing facilities including those located at North Dakota State University and the University of North Dakota. These collaborations require network connectivity that NTN will provide.
- Without the bandwidth NTN provides, our higher education institutions could not participate in many of today's research grant opportunities.
- Historically, universities have led efforts to bring significant, cost-effective increases in bandwidth to the institutions they serve. This expanded connectivity has typically opened doors for the private sector to provide comparable services.

NTN is *not:*

- A high-speed network meant to meet the commodity Internet networking needs of the respective NTN states.
- A replacement for North Dakota's existing state backbone, StageNet.
- A new or ahead-of-its-time effort with regard to our peers.

2003 NTNC



2008 NTNC