



# Nebraska Information Technology Commission

## STANDARDS AND GUIDELINES

### Network Edge Device Standard for Entities Choosing to Connect to Network Nebraska

Category	<b>Network Architecture</b>
Title	<b>Network Edge Device Standard for Entities Choosing to Connect to Network Nebraska</b>
Number	

Applicability	<input checked="" type="checkbox"/> <b>State Government Agencies</b> <input checked="" type="checkbox"/> All ..... <b>Standard</b> <input type="checkbox"/> Excluding ..... <b>Not Applicable</b>
	<input type="checkbox"/> <b>State Funded Entities -</b> ..... <b>Not Applicable</b> <input checked="" type="checkbox"/> <b>Other:</b> Entities electing to connect to <i>Network Nebraska</i> ..... <b>Standard</b>
<b>Definitions:</b> <b>Standard</b> - Adherence is required. Certain exceptions and conditions may appear in this document, all other deviations from the standard require prior approval (see Section 4.3). <b>Guideline</b> - Adherence is voluntary.	

Status	<input checked="" type="checkbox"/> Adopted <input type="checkbox"/> Draft <input type="checkbox"/> Other:_____
Dates	Version Date: April 17, 2006 Date Adopted by NITC: May 1, 2006 Other: <a href="#">Revision November 8, 2011</a>

## 1.0 Technical Standard

All state government agencies, boards, and commissions, and entities electing to connect to Network Nebraska for purposes of transmitting data across the state shall comply with this standard.

### 1.1 Network Edge Device Specifications for new purchases

- QoS capabilities
- Sufficient ports for desired network design
- Security and/or firewall features
- Routing and/or routing protocol
- Traffic shaping and rate limiting
- VLAN (802.1q) support
- Secure remote management (SSH)
- Hardware based encryption acceleration
- Performance to meet anticipated usage demand
- [Compatibility with central site router features](#)
- [IPv6 capable](#)

Option A:

Layer 3 Router (for basic site deployment)

Option B:

Enhanced Layer 3 Router (for larger site deployment or higher performance)

Option C:

Layer 3 Switch/[Firewall combination](#)

### 1.2 Network Edge Device Specifications for existing equipment

- QoS capabilities
- Sufficient ports for desired network design
- Security and/or firewall features
- Routing and/or routing protocol
- Traffic shaping and rate limiting
- VLAN (802.1q) support
- Secure remote management (SSH)
- Hardware based encryption acceleration
- Performance to meet anticipated usage demand
- [Compatibility with central site router features](#)
- [IPv6 capable](#)

## 2.0 Purpose and Objectives

The purpose of this standard is to set minimum standards and specifications for network edge devices that would perform the routing and switching functions of voice, video, and data across the network and assure that packets would get to their correct destination while maintaining the appropriate quality of service (QoS).

### 2.1 Background

~~Network Nebraska--Education~~ currently has about ~~200-245~~ local school ~~districts,~~ ~~educational service units~~ and ~~colleges/campuses~~ that use ~~managed high-bandwidth~~ interactive video and Internet services over ~~45-Mbps DS-3~~ ~~high bandwidth fiber transport~~ circuits. ~~As these contracts reach the end of their terms, network upgrade or replacement will be examined through the bid process. In order to accomplish this upgrade,~~ ~~more~~Network Nebraska--Education requires that intelligent edge devices ~~must~~ be deployed at the school and campus levels to be able to ensure an acceptable quality of service, packet prioritization, better security and firewall features, and remote management. The Technical Panel of the NITC, in cooperation with the operational staff of ~~Network Nebraska--Education~~, are naming these edge device standards for educational entities seeking to connect to Network Nebraska in order to comply with the provisions of ~~LB 1208 (2006)-Neb. Rev. Stat. 86-5,100 and 86-520.01.~~

~~Approximately 100 other high schools have 100 Mbps or greater local connections that may opt to connect to Network Nebraska for reasons of statewide data exchange. This standard contains new equipment and existing equipment standards that would also apply to their edge device installation.~~

### 2.2 Objective

The objective of this standard is to prescribe the acceptable routing and switching device attributes that can be deployed at the local sites of ~~Network Nebraska--Education~~ in order to achieve a multipurpose, converged network, capable of traffic prioritization and shaping, that performs reliably and ensures an expected quality of service.

The ~~Specifications~~ specifications for purchase of new equipment affects those ~~Network Nebraska--Education~~ entities that will be ~~upgrading existing fiber circuits and purchasing new edge devices for connecting connection~~ to ~~Network Nebraska--Education~~. ~~in the 2007-2009 time frame.~~

The ~~Specifications~~ specifications for existing equipment affects those entities that may have already upgraded to IP networking over high bandwidth circuits, have recently purchased or upgraded their edge equipment, and are connecting to ~~Network Nebraska--Education~~. ~~in the 2007-2009 time frame.~~

## 3.0 Definitions

### 3.1 IP

Internet Protocol. Packet-based protocol for delivering data across networks.

### 3.2 IPv6

[Internet Protocol version 6 is an upgrade to IP version 4. While IPv4 allows 32 bits for an Internet Protocol address, and can therefore support  \$2^{32}\$  \(4,294,967,296\) addresses, IPv6 uses 128-bit addresses, so the new address space supports  \$2^{128}\$  \(approximately 340 undecillion or  \$3.4 \times 10^{38}\$ \) addresses.](#)

### **3.2-3 Mbps**

Megabits per second. A unit of measure of data of 1,000,000 bits per second.

### **3.3-4 Network Nebraska**

Network Nebraska is the term used to describe the statewide multipurpose telecommunications backbone and all of its associated service offerings and support. Network Nebraska is made possible through a consortium of public entities working together to provide a scalable, reliable and affordable infrastructure capable of carrying a spectrum of services and applications. [Network Nebraska shall meet the demand of state agencies, local governments, and educational entities. Network Nebraska—Education is the sub-network managed to serve the needs of public and nonpublic K-12 education, and public and nonpublic higher education.](#)

### **3.4-5 QoS**

Quality of Service. The ability to define a level of performance in a data communications system.

### **3.5-6 router**

A device or setup that finds the best route between any two networks using IP addressing, even if there are several networks to traverse. Like bridges, remote sites can be connected using routers over dedicated or switched lines to create wide area networks.

### **3.6-7 SSH**

Secure Shell (SSH client) is a program for logging into a remote machine and for executing commands on a remote machine. It is intended to replace rlogin and rsh, and provide secure encrypted communications between two untrusted hosts over an insecure network.

### **3.7-8 switch**

A mechanical or solid state device that opens and closes circuits, changes operating parameters or selects paths for circuits on a space or time division basis.

### **3.8-9 VLAN**

Virtual Local Area Network. Virtual LANs (VLANs) can be viewed as a group of devices on different physical LAN segments which can communicate with each other as if they were all on the same physical LAN segment.

## **4.0 Applicability**

### **4.1 State Government Agencies**

This standard applies to all state government agencies, boards, and commissions.

## 4.2 Other Entities

This standard applies to entities electing to connect to Network Nebraska--[Education](#).

## 4.3 [ExemptionWaivers](#)

[Exemptions may be granted by the NITC Technical Panel upon request by an agency or other entity. Entities seeking a waiver of this standard should follow the process described in NITC Waiver Policy 1-103: <http://www.nitc.nebraska.gov/standards/1-103.html>](#)

### 4.3.1 [Exemption Process](#)

[Any agency or other entity may request an exemption from this standard by submitting a "Request for Exemption" to the NITC Technical Panel. Requests should state the reason for the exemption. Reasons for an exemption include, but are not limited to: statutory exclusion; federal government requirements; or financial hardship. Requests may be submitted to the Office of the NITC via e-mail or letter \(Office of the NITC, 521 S. 14th Street, Suite 301, Lincoln, NE 68508\). The NITC Technical Panel will consider the request and grant or deny the exemption. A denial of an exemption by the NITC Technical Panel may be appealed to the NITC.](#)

## 5.0 Responsibility

### 5.1 NITC

The NITC shall be responsible for adopting minimum technical standards, guidelines, and architectures upon recommendation by the technical panel. (N.R.S. 86-516 §6)

### 5.2 *Network Nebraska* Operational entities

The Collaborative Aggregation Partnership, composed of the University of Nebraska Computer Services Network, the Department of Administrative Services--Division of Communications, and Nebraska Educational Telecommunications, will be responsible for sharing the responsibilities of the network operations portion of *Network Nebraska*. The responsibility for identification and mitigation of non-compliant entities with respect to the Network Edge Device Standard resides with the Collaborative Aggregation Partnership.

### 5.3 [Equipment Reporting](#)

[An education-related political subdivision shall provide notice in writing, as required by guidelines established by the University of Nebraska and the Chief Information Officer for participation in Network Nebraska, to the distance education director of the Educational Service Unit Coordinating Council, the University of Nebraska, and the Chief Information Officer prior to the use of any new or additional equipment that will impact the use of Network Nebraska by such education-related political subdivision or other education-related political subdivisions. \(<http://www.networknebraska.net/equipment.shtml>\) \(N.R.S. 86-520.01\)](#)