

Private Network and Internet Bandwidth Allocation and Security Monitoring Policy

Effective February 23, 2017

The Private Network and Internet Bandwidth Allocation and Security Monitoring Policy (hereinafter referred to as the “Policy”) is intended to create an equitable method of determining how much private network and internet bandwidth is funded by the K-12 School Technology Initiative Committee (the “K-12 Committee”) for each public school and library in South Carolina. The K-12 Committee considered the bandwidth and security monitoring requirements of South Carolina’s schools and libraries as well as commercially available technology in developing the standards of this Policy. The following Policy was approved by the Principals of the K-12 Committee, on Feb. 23, 2017.

Definitions and Acronyms:

FY	Funding year: begins July 1 and ends June 30.
LAN	Local area network.
WAN	Wide area network.
Mb	Megabits per second, unit to measure bandwidth.
Gb	Gigabits per second, unit to measure bandwidth.
Educational Rate (E-Rate)	Reimbursement administered by the Universal Service Administration Company under the authority of the Federal Communications Commission’s Universal Service Fund.
Consortium Members	Schools, charter schools and libraries who receive connectivity services from the South Carolina E-Rate Consortium.
Site Verification	Verification of a Consortium member’s instructional and administrative buildings.
DMZ	Demilitarized Zone: a firewall security configuration of segregating publicly accessible (semi-trusted) systems/networks from internal (trusted) systems/networks.
Authorized Representative	District superintendent, district IT director, school principal, school IT director, library director or library IT director.
Population	Total number of students enrolled in grades kindergarten through 12 th grade in the school or district on the 45 th day of school.
PNSP	Private network service provider.
ISP	Internet service provider.
DTO	South Carolina Department of Administration’s Division of Technology Operations.
DIS	South Carolina Department of Administration’s Division of Information Security.

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School District	As defined in SC Code §59-1-160 and special districts where internet and/or WAN services are provided by the SC E-Rate Consortium.
Charter School	As defined in SC Code §59-40-40 and for the purposes of this policy includes special schools electing to receive services from the SC E-Rate Consortium.
Library	As defined in SC Code §4-9-35 and special municipal-owned libraries electing to receive services from the SC E-Rate Consortium.
Special Schools	Career and technology education centers operated by one or more school districts.
T1/MPLS	Alternative modalities for delivering private network bandwidth, instead of Ethernet.
IDS	Intrusion detection system.
SOC	Security Operations Center.

Policy Overview

This Policy establishes the criteria the SC E-Rate Consortium (hereinafter referred to as the “Consortium”) will use to evaluate requests for funding for private network and internet bandwidth increases and decreases. As detailed below, recent bandwidth utilization and forecast bandwidth utilization will serve as the primary criteria for evaluating bandwidth increases or decreases.

This Policy also establishes a schedule the Consortium will use to determine the portion of internet and private network costs funded with state funds and, if applicable, the portion leveraged as cost share by the Consortium member.

Section A of this Policy details how a Consortium member requests a bandwidth increase or decrease, and the criteria the State E-Rate Coordinator will use to evaluate a bandwidth increase or decrease request.

Section B of this Policy defines bandwidth over-allocation.

Sections C, D, E and F of this Policy detail the funded and cost share internet and private network bandwidth schedules for Consortium members.

Section G of this Policy provides four bandwidth allocation scenarios, the criteria used to evaluate the request and the determination by the State E-Rate Coordinator.

Section H of this Policy details what Security Monitoring Services are provided to Consortium members by the State as well as optional Security Monitoring Services provided to Consortium members for a fee.

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A. Evaluating Requests for Bandwidth Increases or Decreases

Any School District, Charter School or Library that is a member of the Consortium may request funding for an increase or decrease in its current internet and private network bandwidth allocation. Hereinafter, such a request shall be referred to simply as a bandwidth increase or decrease. Upon submitting such a request, the School District, Charter School, or Library agrees to comply with the Consortium's determination and take all steps necessary and incidental to effectuating the Consortium's determination.

1. Submitting a Request for Private Network or Internet Bandwidth Increase or Decrease

- a. An authorized school district representative, independent charter school principal or main library representative may request a bandwidth increase or decrease by submitting the following documentation to the State E-Rate Coordinator:
 - i. District name and/or Library System name
 - ii. Six consecutive calendar months (including school holidays and summer breaks) of private network or internet bandwidth utilization records
 - iii. School or library network diagram
 - iv. Narrative supporting the bandwidth request to include:
 - a. Description of trouble tickets to PNSP or internet service provider (if available)
 - b. Six consecutive calendar month forecast of private network or internet bandwidth utilization
- b. Representatives from schools, special/charter schools or library branches must submit private network bandwidth increases to their respective authorized district or main library contact, not directly to the State E-Rate Coordinator.

2. Evaluating a Private Network or Internet Bandwidth Request

- a. The State E-Rate Coordinator will evaluate the private network or internet bandwidth utilization report and network diagram based on the following criteria:
 - i. Overall efficiency of network design and hardware infrastructure to support the request
 - ii. Use of security hardware and software supporting the environment
 - iii. Trend of average bandwidth utilization during the previous six consecutive month calendar period and forecast bandwidth utilization for the next six consecutive calendar months

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- iv. Trend of peak bandwidth utilization over the previous six consecutive calendar month period and forecast bandwidth utilization for the next six consecutive calendar months
 - v. School or library specialization in bandwidth intensive programming
 - vi. Significant increase or decrease in student population and/or 1:1 computing
- b. Bandwidth will be limited or adjusted in increments determined by the PNSP and/or internet service provider's products provided under the state master contract.

For example, a district has 1 Gb internet bandwidth capacity and requests a bandwidth increase to 3 Gb. The applicable increments available from the internet service provider are either 2 Gb or 5 Gb. In this example, the policy will limit that increase to 2 Gb.

**Please see Section G for additional scenarios relating to bandwidth increases and decreases.*

**Please note requests for Private Network and internet bandwidth increases are not guaranteed.*

B. Over Allocation of Bandwidth

From time to time, Consortium members may have been over-allocated bandwidth. To ensure state and federal funds are spent as efficiently as possible, the State E-Rate Coordinator will evaluate private network and internet bandwidth usage.

Over allocated bandwidth is defined as average bandwidth utilization of less than 30 percent over a six consecutive calendar month period of time and where the average peaking bandwidth utilization does not exceed 50 percent.

The Consortium may require that a school or library reduce the private network unfunded bandwidth in increments based on the respective PNSP/ISP products provided on the state master contract.

**Please see Section G for additional scenarios relating to bandwidth decreases.*

C. Private Network Bandwidth Allocation Policy for Schools

1. Funded Bandwidth

For FY 2016-17 the SC E-Rate Consortium will continue to provide all schools with 999 students or fewer with a maximum of 100Mb of bandwidth at no cost to the school district. The

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bandwidth at Hub/Aggregation Points for complex, multi-school sites will be determined by DTO based on the state of commercially available technology.

For individual school locations with reported student population above 1,000, the following tiers detail the funded portion paid by the Consortium and are subject to appropriation from the General Assembly and reimbursement from the E-Rate program.

Tier	Individual School Population	Funded Bandwidth
1	less than or equal to 999	100 Mb
2	1,000 to 2,500	1 Gb
3	greater than 2,501	2 Gb

Note: Special Schools as defined in Section D, 1, b are not eligible for funded private network bandwidth services.

2. Unfunded Bandwidth

If a school is approved for more than the funded bandwidth, the school will be responsible for a portion of the difference in cost of the additional, unfunded bandwidth. The amount paid by the school is referred to as the “cost share.” A calculation example is provided (Section C, 2, a) below.

a. Cost Share Calculations

The monthly cost share is the portion of the total cost of the bandwidth in excess of the funded bandwidth for private network service not covered by E-Rate funding.

The Cost Share formula is:

$$\text{Cost of Requested Bandwidth} - \text{Cost of Funded Bandwidth} = \text{Cost Difference}$$

$$\text{Cost Difference} * \text{District Non-Discount \% (100 percent - District \%)} = \text{Monthly Cost Share}$$

Example 1 – School A (90 percent District) is approved for 100 Mb and requests 250Mb:

Current 250Mb cost	\$1,200	(PNSP Service Provider Avg. for 250Mb)
<u>Minus baseline 100Mb cost</u>	<u>\$1,110</u>	<u>(PNSP Service Provider Avg. for 100Mb)</u>
= Difference	\$90	
Times 10 percent (100%-	\$9	Monthly Cost Share

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90%)		
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Example 2 – School B (80 percent District) is approved for 100 Mb and requests 250 Mb:

Current 250Mb cost	\$1,200	(PNSP Service Provider Avg. for 250Mb)
Minus baseline 100Mb ¹ cost	\$1,110	(PNSP Service Provider Avg. for 100Mb)
= Difference	\$90	
Times 20 percent (100%-80%)	\$18	Monthly Cost Share

¹Libraries must use a 50Mb baseline to calculate cost share. Please see Page 7 (Part E, Number 2, section a) for more information.

**Examples are for illustrative purposes and not representative of actual pricing*

**Please see Section G for additional scenarios relating to bandwidth increases and decreases.*

**Please note requests for Private Network and Internet bandwidth increases are not guaranteed.*

D. Internet Bandwidth Allocation Policy for School Districts

1. Funded Bandwidth

- a. For FY 2016-17, the Consortium will provide all school districts with 2,500 students or fewer with a maximum 250Mb of funded internet bandwidth at no additional cost to the school district.

For school districts with reported student populations above 2,501, the following tiers detail the funded portion paid by the Consortium and are subject to appropriation from the General Assembly and reimbursement from the E-Rate program.

FY 2016-17 Internet Bandwidth Tiers for School Districts:

Tier	District Student Population	Funded Bandwidth
1	0 to 2,500	250 Mb
2	2,501 to 3,000	300 Mb
3	3,001 to 3,500	350 Mb

¹ Libraries must use a 50Mb baseline to calculate cost share. Please see Page 7 (Part E, Number 2, section a) for more information.

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4	3,501 to 4,000	400 Mb
5	4,001 to 4,500	450 Mb
6	4,501 to 5,000	500 Mb
7	5,001 to 5,500	550 Mb
8	5,501 to 6,000	600 Mb
9	6,001 to 7,000	700 Mb
10	7,001 to 8,000	800 Mb
11	8,001 to 9,000	900 Mb
12	9,001 to 10,000	1.0 Gb
13	10,001 to 10,500	1.5 Gb
14	10,501 to 20,000	2.0 Gb
15	20,001 to 25,000	2.5 Gb
16	25,001 to 30,000	3.0 Gb
17	30,001 to 35,000	3.5 Gb
18	35,501 to 40,000	4.0 Gb
19	40,001 to 45,000	4.5 Gb
20	45,001 to 50,000	5.0 Gb
21	50,001 to 55,000	5.5 Gb
22	55,001 to 60,000	6.0 Gb
23	60,001 to 65,000	6.5 Gb
24	65,001 to 70,000	7.0 Gb
25	70,001 to 75,000	7.5 Gb

Note: Managed Router Service of 50Mb is available to all Consortium members. Members requesting this service in excess of 50 Mb are required to pay the applicable monthly cost share of 10 percent.

- b. For FY 2016-17, the Consortium will continue to provide all Special Schools with 200 students or fewer with a maximum 30Mb of funded internet bandwidth at no additional cost to the special schools.

The following funded internet bandwidth tiers are subject to appropriation from the General Assembly and reimbursement by the E-Rate program.

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FY 2016-17 Internet Bandwidth Tiers for Special Schools:

Tier	Special School Student Population	Funded Bandwidth
1	Less than or equal to 200	30 Mb
2	Greater than or equal to 201	50 Mb

2. Unfunded Bandwidth

If a Special School is approved for more than the funded bandwidth, the school will be responsible for a portion of the difference in cost of the additional, unfunded bandwidth. The amount paid by the school is referred to as the “cost share.” A calculation example is described (Section D, 2, a) below.

a. Cost Share Calculations

The monthly cost share is the portion of the total cost of the unfunded bandwidth in excess of the funded bandwidth for internet service not covered by E-Rate funding.

The Cost Share formula is:

$$\text{Cost of Requested Tier} - \text{Cost of Funded Tier} = \text{Cost Difference}$$

$$\text{Cost Difference} * \text{District Non-Discount \% (100\% - District \%)} = \text{Monthly Cost Share}$$

Example 1 – District A (90 percent) is in Tier 1 and approved for 30 Mb and requests 50 Mb:

Current 50 Mb cost	\$2,800	(Internet Service Provider Avg. for 50 Mb)
<u>Minus baseline 30 Mb cost</u>	<u>\$1,700</u>	<u>(Internet Service Provider Avg. for 30 Mb)</u>
=Difference	\$1,100	
Times 10 percent (100%-90%)	\$110	Monthly Cost Share

**Examples are for illustrative purposes and not representative of actual pricing*

**Please see Section G for additional scenarios relating to bandwidth increases and decreases.*

**Please note requests for Private Network and Internet bandwidth increases are not guaranteed.*

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E. Private Network Bandwidth Allocation Policy for Library Systems

1. Funded Bandwidth

For FY 2016-17, the Consortium will continue to provide all Library Systems up to a maximum of 50Mb of private network bandwidth for each branch, where available, at no additional cost to the Library System, subject to appropriation from the General Assembly and reimbursement by the E-Rate. The bandwidth at Hub/Aggregation Points will be determined by the DTO Network Design group based on the state of commercially available technology.

**Note: T1's or MPLS may be provided where Ethernet or fiber is not available or cost effective.*

2. Unfunded Bandwidth

If a Library System is approved for more than the funded bandwidth, the library will be responsible for a portion of the difference in cost of the additional unfunded bandwidth. The amount paid by the library is referred to as the "cost share."

a. Cost Share Calculations

Cost Share calculations for Library Systems will use the same formula as described in Section C, 2, Private Network Bandwidth Allocation Policy for Schools, but for a 50Mb baseline.

**Please see Section G for additional scenarios relating to bandwidth increases and decreases.*

**Please note that requests for Private Network and Internet bandwidth increases are not guaranteed.*

F. Internet Bandwidth Allocation Policy for Library Systems

1. Funded Bandwidth

For FY 2016-17, the Consortium will continue to provide library systems with internet bandwidth at no cost to the library systems. Funding is subject to appropriation from the General Assembly and reimbursement by the E-Rate program.

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A library system's request for internet bandwidth increase or decrease will be evaluated based on the criteria stated in Section A of this policy.

2. Unfunded Bandwidth

Library Systems are not responsible for cost shares for internet services.

**Please see Section G for additional scenarios relating to bandwidth increases and decreases.*

**Please note requests for Private Network and Internet bandwidth increases are not guaranteed.*

G. Bandwidth Increase and Decrease Scenarios

The following scenarios are for illustrative purposes only and meant to represent the general process taken to evaluate requests for internet and private network bandwidth increases or decreases.

Scenario #1: A school district requests an internet bandwidth increase from 1 Gb to 1.5 Gb.

In this scenario, a school district submits a request to increase its internet bandwidth from 1 Gb to 1.5 Gb.

School District Bandwidth Increase Request Documentation:

1. Six Month Internet Bandwidth Utilization Report
 - a. School district's six month internet bandwidth utilization report indicates the school district averages 83 percent internet bandwidth utilization and peaks above 95 percent utilization for several hours per week each week during the six month utilization period.
2. Network Diagram
 - a. School district's network diagram that suggests the private network is operating near full bandwidth capacity, efficiently maintained and no technical issues reported.
3. Narrative
 - a. School district provided a short narrative describing the district's plans to increase a 1:1 device program for half of the district's schools.

Cost Share Criteria:

School district's student population is 10,473 students which makes the school district eligible for the 1.5 Gb service at no cost to the district.

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Determination:

The bandwidth utilization report, network diagram and narrative clearly suggest the school district needs to increase its internet bandwidth. In this scenario, the State E-Rate Coordinator would authorize the bandwidth increase and submit a revised Memorandum of Understanding to the school district detailing the services provided. Based on the school district's total student population, the school district's request for 1.5 Gb service will not require any cost share from the district.

Scenario #2: A school district requests an internet bandwidth increase from 250 Mb to 1 Gb.

In this scenario, a school district submits a request to increase its internet bandwidth from 250Mb to 1Gb.

School District Bandwidth Increase Request Documentation:

1. Six Month Internet Bandwidth Utilization Report
 - a. District's six month internet bandwidth utilization report indicates the district averages 90 percent internet bandwidth utilization and peaks above 95 percent utilization on a regular basis.
 - b. The District manages its own private network and provides bandwidth usage for each of the district's schools which indicates the schools are operating at a much higher bandwidth allocation than the district hub.
2. Network Diagram
 - a. School district's network diagram suggests the private network is operating normally.
3. Narrative
 - a. School district provided a narrative describing its plans to create a 1:1 device program for 200 fifth-graders.

Cost Share Criteria

The school's student population is 982 students which makes the school eligible for 100Mb service at no cost to the district, however the school district currently pays \$600/month in cost share for the 250Mb service based on the 20 percent cost share model.

Determination

In this scenario, State E-Rate Coordinator would not authorize an internet

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bandwidth increase from 250Mb to 1Gb. Instead, the State E-Rate Coordinator will authorize a bandwidth increase to 500Mb which is the service provider's next largest commercially available product.

The State E-Rate Coordinator will submit a revised Memorandum of Understanding to the school district detailing the services provided. Based on the schedule listed in Section D, 1, the school district would be required to pay approximately \$800/month in cost share based on the 20 percent cost share calculation as referenced in Section D, 2, a.

Due to the fact the school was not increased to the requested level, the State E-Rate Coordinator will request bandwidth monitoring reports on a monthly basis for the six months after the service is increased. The school could be eligible for another bandwidth increase at the end of that review period.

Scenario #3: A school district requests an internet bandwidth increase from 1Gb to 3Gb.

In this scenario, a school district submits a request to increase its internet bandwidth from 1Gb to 3Gb.

School District Bandwidth Increase Request Documentation:

1. Six Month Internet Bandwidth Utilization Report
 - a. School district's six month internet bandwidth utilization report indicates the school district averages 71 percent internet bandwidth utilization and peaks above 95 percent utilization during specific high traffic events, such as online testing, during the six month utilization period.
2. Network Diagram
 - a. School district's network diagram suggests the private network is operating near full bandwidth capacity, efficiently maintained and no technical issues reported.
3. Narrative
 - a. School district provided a short narrative describing the district's plans to increase a 1:1 device program for half of the district's schools.

Cost Share Criteria:

The school district's student population is 25,201 students which makes the school district eligible for the 3Gb service at no cost to the district.

Determination:

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Despite the fact that the school district is eligible for 3Gb internet service, the primary criteria for bandwidth increases is current bandwidth utilization. The narrative clearly suggests the school district needs to increase its internet bandwidth, but the State E-Rate Coordinator would only authorize a bandwidth increase to 1.5Gb which is the next largest commercially available product from the service provider.

The State E-Rate Coordinator will submit a revised Memorandum of Understanding to the school district detailing the services provided. Based on the school district's total student population, the school district's new 1.5Gb service will not require any cost share.

Due to the fact the school was not increased to the requested level, the State E-Rate Coordinator will request bandwidth monitoring reports on a monthly basis for the six months after the service is increased. The school will be eligible for another bandwidth increase at the end of that review period.

Scenario #4: A school district was provided 2Gb of internet bandwidth, however average utilization does not exceed 35 percent and peak utilization does not exceed 50 percent.

This scenario suggests the school district was provided more bandwidth than what it needs. The State E-Rate Coordinator will evaluate the school district's network diagram, 1:1 device program plans and online testing schedules. In the event the school district was over-allocated internet bandwidth, the State E-Rate Coordinator will initiate a request to reduce the school district's internet bandwidth commensurate with the factors detailed in Section A, 2, a.

The SC E-Rate Coordinator will provide the school district with a revised Memorandum of Understanding detailing the new service agreement and the cost (if applicable) to the school district.

H. Security and Traffic Monitoring for Schools and Libraries:

As efficient bandwidth utilization becomes increasingly important to Consortium members, information security will continue to be an essential service to protect internet connectivity. This policy details the roles and responsibilities between the Consortium members, DTO and Division of Information Security.

1. Provided Services

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a. Real-time Monitoring of Consortium Member Networks

SC E-Rate Consortium members are required to provide DTO and DIS staff with access to the Consortium member's network to install and service equipment and software to monitor security threats.

The following security threat monitoring and communication services are available to Consortium members:

- i. Network entry point and DMZ monitoring using an IDS on district networks.
- ii. Notification of critical security events based on SOC monitoring of IDS.
- iii. Notification of configuration or hardware issues that affect correct IDS operation

2. Optional Services

a. Security Threat Consulting and Event Remediation Services

Security threat consulting and event remediation services are not provided to Consortium members. However, Consortium members who deem those services necessary, may procure additional security threat consulting and event remediation services from a contractor, DTO and/or DIS.

The following items are examples of optional services which can be procured from a contractor, DTO and/or DIS, should a Consortium member deem those services necessary:

- i. Security consulting, training and implementation assistance
- ii. Secure system design and planning
- iii. Incident consulting & law enforcement coordination
- iv. Assistance with forensic analysis & reporting