

# A Strong Network is Part of a Strong BCPS



**Digital Learning** – Students and teachers can harness the power of technology to personalize learning and differentiate instruction using digital tools

**Security** – Digital and Physical Security requires a fast, efficient, well-designed network

**Engaged Communities** – BCPS staff and students use programs everyday on the BCPS network that help them stay connected to each other and their community



# A Network is Comprised of Layers

Layer & Specification	Description
<b>Uplink, Firewall &amp; Datacenter</b> - <i>Specification:</i> 40Gbps fiber uplinks; 80Gbps firewall capacity	The uplink is the cabling that connects the District back to its internet service provider (ISP). The firewall is a server (powerful computer) that provides security by inspecting all internet traffic leaving and entering the district. This and other equipment resides in the datacenter.
<b>Wide Area Network (WAN)</b> - <i>Specification:</i> Hub and spoke design with 1Gbps at 75% of sites; 10Gpbs at 25%	The wide area network (WAN) is comprised of cables beneath the ground, connecting all schools and facilities back to the datacenter.
<b>School Switching &amp; Routing</b> - <i>Specification:</i> 1Gbps switch ports; 2Gbps uplinks within schools	Equipment at school and office sites used to receive the internet cabling from the street and spread the data connectivity throughout each building in a system of relayed cables.
<b>Wireless Access Points (WAPs)</b> - <i>Specification:</i> 17,600 WAPs deployed district wide - 802.11 ac/n 5GHz	Wireless Access Points are typically attached to ceilings and provide wireless internet access to students, staff, and members of the public in BCPS facilities. In schools, one WAP per classroom is usually placed with more devices used in dense areas such as media centers and cafeterias.



# The Vision: Utility-Like Internet

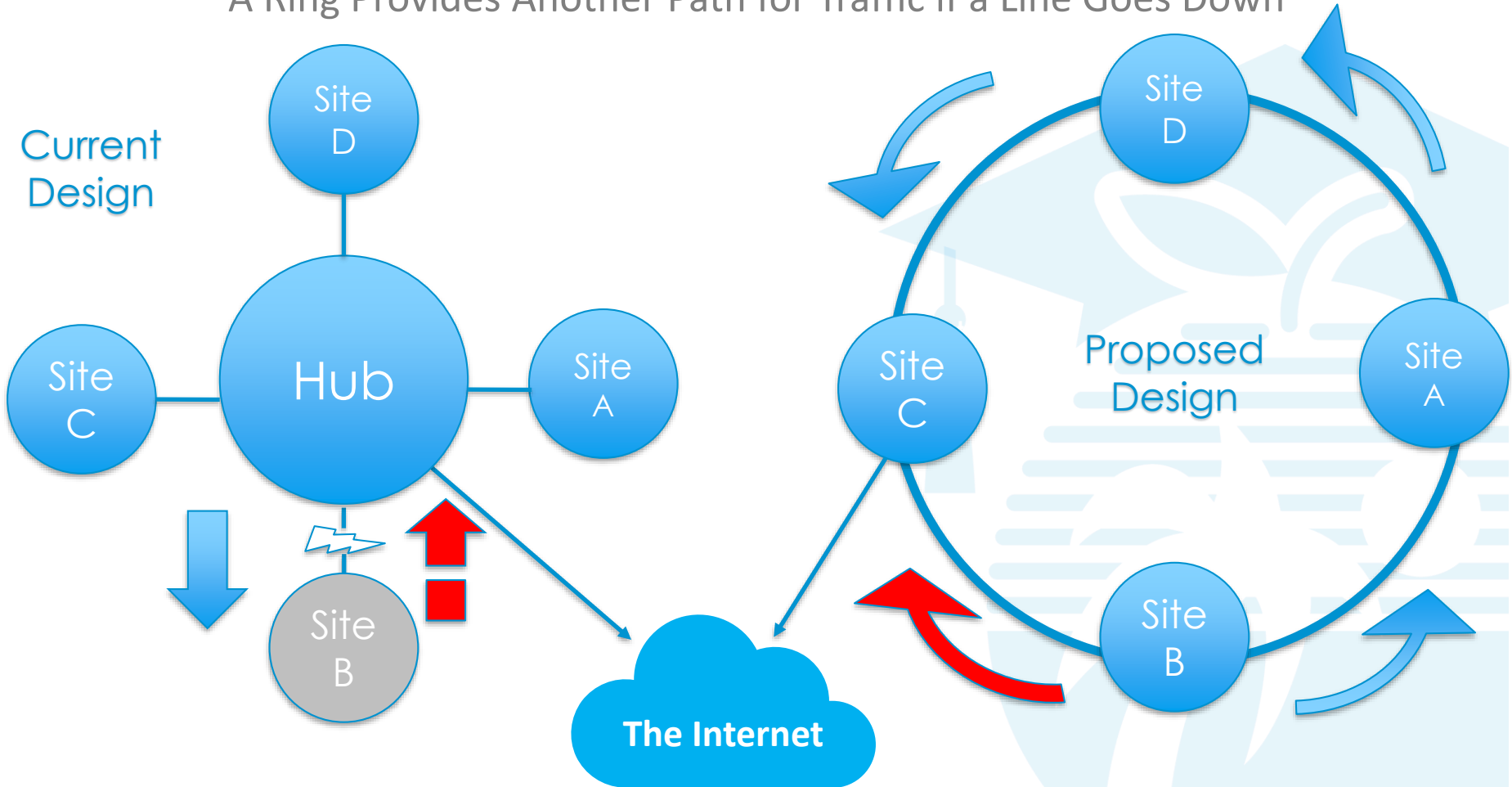
Equipment & Spec	Today's Challenges	Future Steps
<b>Uplink, Firewall &amp; Datacenter</b> - <i>Performance:</i> Firewall 99% avg. uptime vs. 99.9% industry standard <sup>1</sup> ; Firewall CPU utilization 75%	Bond funds were used to upgrade firewall, load balancing, routing and District switching, as well as DNS/DHCP, but funds need to be identified to sustain assets  Speeds are good, but there is only one path back to internet provider	Identify funds to refresh District network equipment (SY20 Cat 2 Equipment E-Rate bid)  Add 2 <sup>nd</sup> path to Internet (SY21)  Outsource firewall management to experts (SY22 <sup>3</sup> )
<b>Wide Area Network (WAN)</b> - <i>Performance:</i> Currently 98.31% avg. <sup>2</sup> availability vs. 99.9% industry standard <sup>1</sup>	WAN capacity is dramatically lower than SETDA/FCC recommendation (e.g., 10 Gbps vs. 40Gbps needed for Cypress Bay)  WAN design lacks resiliency, resulting in frequent schoolwide outages.	Transition from hub & spoke to ring design (SY20)
<b>School Switching &amp; Routing</b> - <i>Performance:</i> 98.3 avg. uptime vs. 99.9% uptime industry standard <sup>1</sup>	No statistics available on within-school data performance due to lack of tools (e.g., SolarWinds)  No refresh cycle defined; equipment replaced on ad-hoc basis	Develop plan to annually refresh E-Rate eligible network equipment (SY20)
<b>Wireless Access Points (WAPs)</b> - <i>Performance:</i> 60Mbps to 160Mbps	WAPs currently running under heavy load (avg. 70% CPU utilization)  Currently expecting increased laptop density and BYOD to add 3 additional devices per secondary student.	Identify funding to increase number of WAPs deployed to support classroom



<sup>1</sup> = 99% allows for 88 hours of downtime annually; NB - Fulton County Schools manages to 99.98% uptime; <sup>2</sup> = Reported by AT&T based on 24-hr clock; <sup>3</sup> = dependent on FCC approval of firewall features for E-Rate

# WAN Upgrade – Improving Resiliency

A Ring Provides Another Path for Traffic if a Line Goes Down



# High Level Timeline – Wide Area Network

## Project Plan

- RFP Solicitation Sept 2018 - Nov 2018
- Posted the Recommendation Tabulation with the RFP Evaluation Committee's official Award Recommendation - Dec 2018
- Negotiations and contract work - 2019
- Board Approval & Award Mar 2020 – Pending
- Submit for Erate March for Erate Approval - March 15 2020
- Vendor to start legwork on building Fiber Network - July 2020
- Begin Site cutover from Hub & Spoke to Ring Design - Jan 2021
- Complete site migration Aug - Sept 2022

## Governance

- Office Of Safety, Security, Emergency Preparedness
- Office Of Information & Technology

