School Board of Highlands County

CHALLENGE

Despite high capacity internet connections, congestion would slow web access at all of the districts schools.

1:1 device scheme would result in tens of thousands of devices simultaneously downloading software updates, exacerbating congestion

SOLUTION

A mix of different **CACHE**BOX models were deployed to serve the different needs of Middle and High Schools

CACHEBOX**CMC** enables the fleet to be managed easily from the district office.

BENEFIT

Over 60% of software trafffic removed from Highlands County's internet connection

Content from key education providers served over 30x faster

About Highlands County

Based in Sebring, Florida, The School Board of Highlands County serves approximately 12,500 students across 16 schools, including nine elementary schools, four middle schools, and three high schools.

The district has made significant investments in digital learning, including a 1:1 Chromebook programme. As a result, reliable and consistent network performance is a day-to-day operational requirement to support teaching, testing, and administration across all schools.

Challenge

Despite having a strong network foundation - over 6Gbps of internet capacity and 1–10Gbps WAN links between schools - Highlands experienced periodic but disruptive congestion.

With up to 12,500 Chromebooks in daily use, large numbers of devices regularly requested the same operating system and application updates at the same time. During update cycles, this duplicated traffic overwhelmed available bandwidth. The final update run before deploying **CACHE**BOX took seven days to complete.

Further upgrading WAN and internet links across 18 schools would have been costly and disruptive - and would not have addressed the underlying issue of repeated downloads of identical content. In addition, higher bandwidth would have triggered knock-on costs for firewalls, filters, licensing, and support, all typically priced by throughput.

Highlands needed a way to manage peak demand more intelligently, without continually overbuilding the network.

Congestion is the problem...

Technology Manager Harry Howes selected web caching as a practical alternative to scaling bandwidth for short-lived peaks.

With E-rate funding secured, Highlands deployed **CACHE**BOX appliances across all schools during winter break. Each school received a **CACHE**BOX sized to match its WAN capacity and usage profile:

- **CACHE**BOX**420** units for use in the district office
- **CACHE**BOX**230** high-usage schools with 10Gbps links
- **CACHE**BOX**210** units for elementary schools with 1Gbps links

www.appliansys.com

ApplianSys House, Harry Weston Road, Coventry, CV3 2UB, United Kingdom
Tel: +44 845 450 5152 | **Fax:** +44 870 762 7063 | **Email:** sales@appliansys.com

> *"**CACHE**BOX saved us tonnes of money. Without caching, we'd have had to buy a bigger internet circuit - and probably upgrade our firewall and filtering to handle the extra load."*

Straightforward HTTPS deployment

HTTPS interception is often a barrier to deployment, but Highlands already had an advantage common to many US districts: all student Chromebooks were issued with a trusted filtering certificate as part of their existing web-filtering infrastructure.

This meant **CACHE**BOX could be introduced into the HTTPS path without any device-side changes. Once the certificate and private key were provided, trust was established immediately.

Deployment was further simplified using the **CACHE**BOX Management Console (CMC). After configuring HTTPS on a single unit, certificates and keys were securely distributed to all remaining **CACHE**BOX appliances across the district in minutes.

Highlands also used policy-based routing on their Aruba infrastructure to precisely control which traffic was cached or bypassed, ensuring HTTPS acceleration was applied only where it delivered value.

The result was a smooth, district-wide deployment with no classroom disruption and immediate performance gains.

Software updates delivered locally - congestion avoided

CACHEBOX immediately absorbed heavy software update traffic, serving repeat requests from local cache and freeing internet capacity for instructional use.

Domain	Served from web	Served from cache	Byte hit ratio
chromebookupdates.com	9.74 TB	7.11 TB	73%
microsoft.com	6.19 TB	2.43 TB	39%
google.com	330 GB	163 GB	49%
windowsupdate.com	192 GB	114 GB	60%

Updates that previously took days to complete were delivered up to five times faster, without monopolising internet capacity.

"Without caching, we'd have had to buy a bigger internet circuit - and probably upgrade our firewall and filtering to handle the extra load," said Harry Howes.

"Caching let us keep what we had and still deliver a good experience. That freed up budget for other priorities."

Faster access to classroom learning resources

CACHEBOX now caches over 60% of Highlands' HTTPS traffic, dramatically accelerating access to frequently used educational platforms while bypassing traffic that cannot or should not be cached.

Students and teachers now experience consistent performance, even during peak classroom usage, with far less dependence on external network conditions or origin server throttling.

Domain	Speed from web	Speed from cache	Speed increase
quizlet.com	133 Kbps	11.2 Mbps	84×
powerschool.com	83.2 Kbps	6.63 Mbps	80×
ixl.com	106 Kbps	6.98 Mbps	66×
edulastic.com	154 Kbps	5.23 Mbps	34×
commonlit.org	184 Kbps	5.89 Mbps	32×
quizizz.com	245 Kbps	7.33 Mbps	30×

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A model for school districts everywhere

Highlands funded its caching deployment through the E-rate programme, which has supported caching since 2015 as a way to improve performance while controlling connectivity costs.

Highlands' experience reflects a broader pattern: reducing duplicated traffic first avoids the need to size networks for rare peak events.

"With a lot of Chromebooks, internet demand only goes one direction - up," said Harry Howes.

"I wouldn't run a one-to-one programme without caching in the mix. It's a simple way to reduce repeat traffic, and it matters more each year."

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