

# Why are US schools deploying web caches?

To get better value out of existing and future bandwidth provision, and to improve internet performance in the classroom, the Federal Communications Commission (FCC) decided to fund caching technologies under E-Rate Category 2.

Designed with schools, for schools, **CACHEBOX** handles more of the education content that matters than other solutions. It is the most widely used caching appliance in K-12.



For schools like **Saint Paul Public Schools** in Minnesota who have deployed **CACHEBOX** in high schools, the results have been a revelation.

## 'LAN speed' peak delivery

- At peak times, a **CACHEBOX** at each school in the district now serves up to 800 Mbps of requests from internet links with no more than 100 Mbps capacity.

## Classroom browser speeds accelerated

- Web content is served 10-15 times faster from cache than from the internet.
- Some education sites are up to 200x faster.

## Taking traffic off the WAN for big bandwidth savings

- By storing and serving content locally, each school reduced link utilisation by 50-60%.
- Bandwidth hogs like Apple, Windows and Chrome updates no longer cause congestion.

## 1. Handle peaks, eliminate congestion

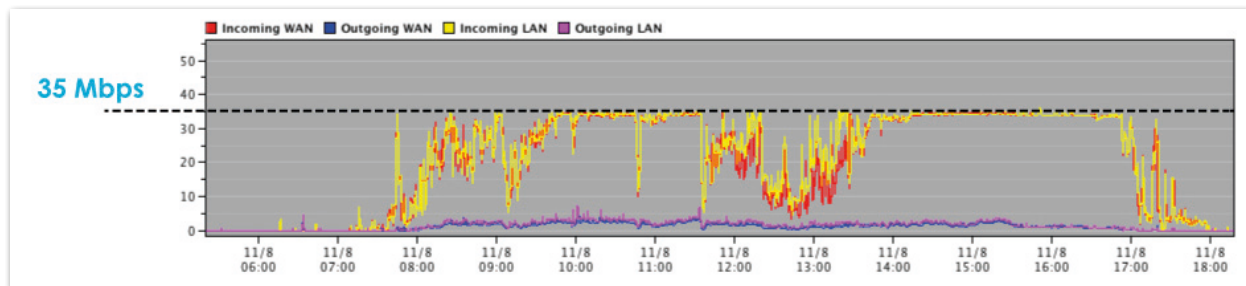
The FCC recommends that schools purchase 1Mbps of bandwidth per student by 2018 and many are significantly below this goal. The target is intended to cater for 50% year-on-year growth in internet usage as schools use more digital content in the classroom.

Increasing bandwidth does not make classroom content faster but it does reduce the congestion which leads to web requests queuing. Congestion that is most frustrating at the start of lessons when teachers direct students to web content that they have planned lessons around. But bandwidth isn't the most effective solution.

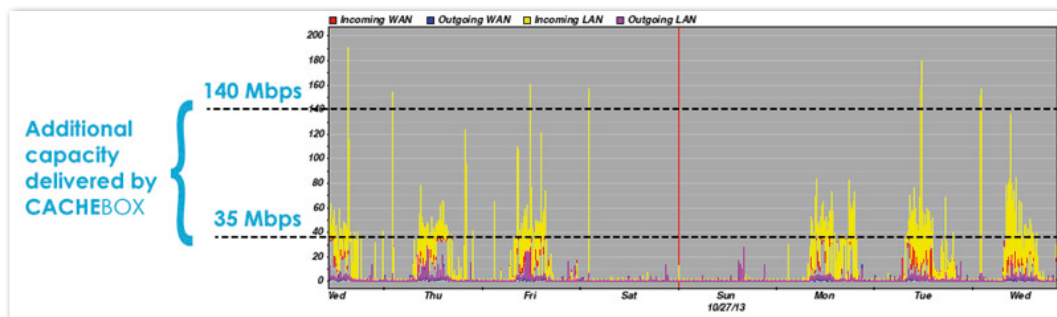


**Sioux Central CSD** suffered painfully slow web-browsing: students trying to download the same video at the start of a lesson needed to wait for several minutes before being able to watch a single minute.

**Before CACHEBOX** - its 35 Mbps internet connection was saturated for much of the school day.

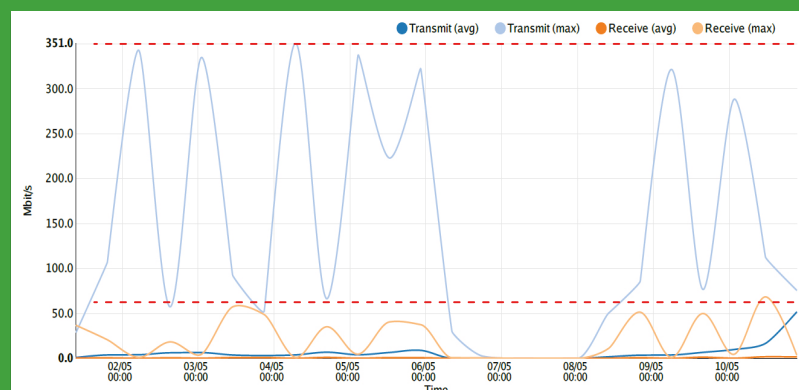


**After CACHEBOX** - demand could be seen peaking at over 140Mbps at the start of each lesson. On occasion it would rise to nearly 200Mbps - this is the bandwidth capacity that Sioux Central required in order to avoid congestion altogether. **CACHEBOX** provided this extra capacity at the times it was most needed.



At PK-8 **Trinity School** near Baltimore, **CACHEBOX** delivers up to 350Mbps of content to students whilst the school's internet connection provides just 50Mbps.

Without **CACHEBOX**, 6 of 7 requests would be queued or timeout before delivery making them, at best, frustratingly slow.

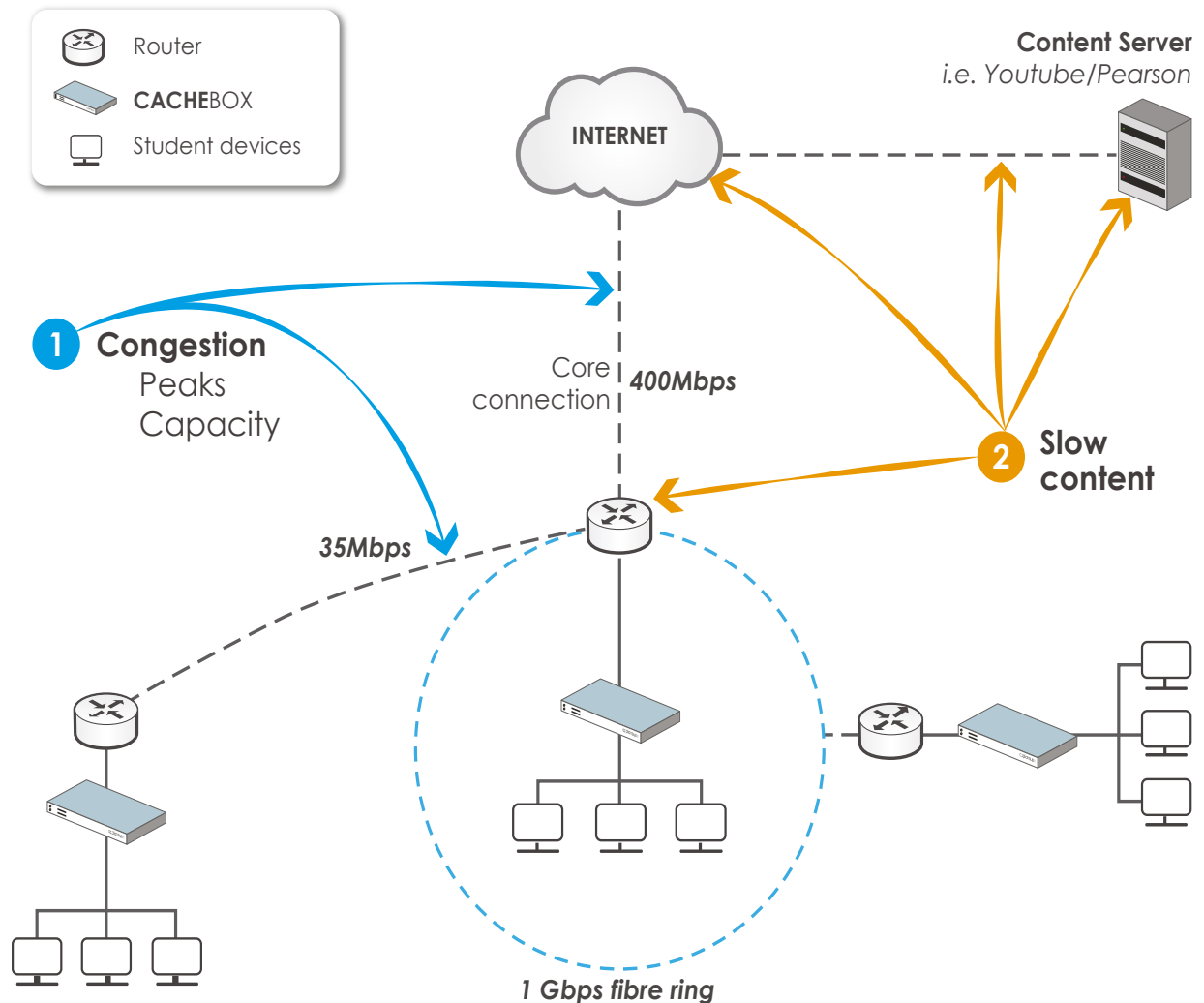


**350Mbps** delivered from **CACHEBOX**

**50Mbps** max from Internet connection

## Where does CACHEBOX help?

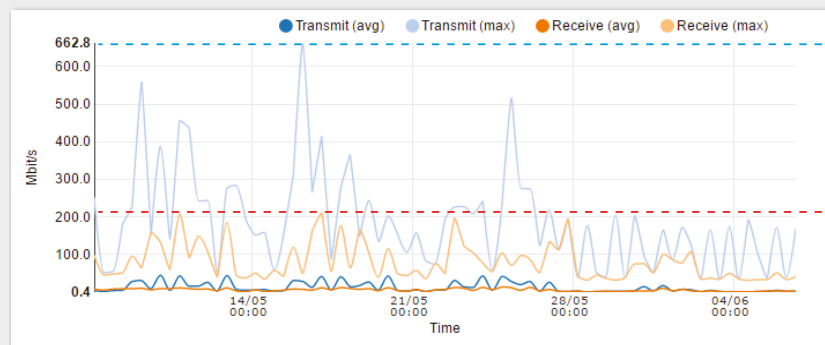
There are many causes of slow web content in the classroom. Issues like insufficient bandwidth are somewhat within a schools control, but a cycle of annual bandwidth upgrades offers ever-decreasing value. Problems like overloaded content servers or data centre latency cannot be addressed by schools. In either case, **deploying caches puts schools back in control of web content performance.**



In 2017 **Des Moines Christian School** in Iowa upgraded its internet connection from

15Mbps to 200Mbps to support classroom internet use by its 900 students.

The K-12 school also deployed **CACHEBOX** and found that, without it, it would have needed over 660Mbps to avoid congestion.



>660Mbps from  
**CACHEBOX**

200Mbps max  
from Internet  
connection

## 2. Sparkling browser speeds – even with slow content

Upgrading to multi-Gigabit links cannot speed up content that is slow at the source or delayed by latency. By storing and serving content from within the LAN, **CACHEBOX** delivers content an order of magnitude faster.



**Laurens County School District**, South Carolina has more than a **10 times average speed increase**:

VOLUME of DATA			
Status	Transfer	% of total	KB/sec
TCP_HIT	302,752.11MB	25.0%	944.40
TCP_MISS	554,805.73MB	45.8%	86.72

Some slow **educational content is served hundreds of times faster from cache**, giving teachers the confidence to include it in lesson plans:

VOLUME of DATA		
Host/target	% cached	KB/sec
*.jquery.com	100.0%	7,170.92
*.readingeggspress.com	0.0%	5.89
*.apple.com	100.0%	1,402.47
*.readingeggsassets.com	99.2%	4,847.73
*.schoolblocks.com	97.8%	8,402.47

**Miami-Dade CPS** needed faster access to an educational content application that was particularly slow at outlying schools on small connections. An individual page comprised 30 different objects and would take as much as 30 seconds to load. With **CACHEBOX**, 97% of the content is served from cache, with most of the page loading instantly.



Learning platform **without caching**: 30 requests \* 1 second for each = **30 seconds load time**.

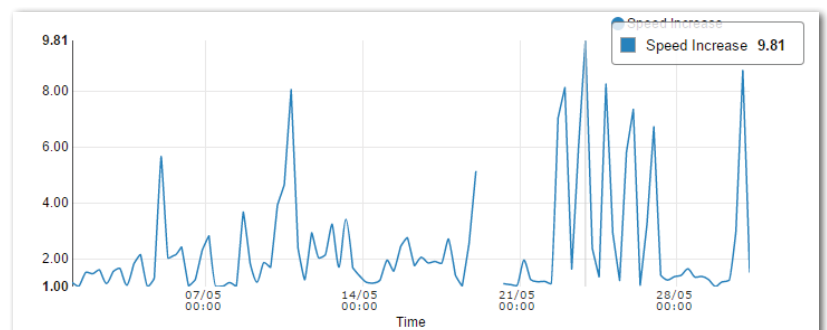


Learning platform **with CACHEBOX**: 29 requests at 0.050 seconds each + 1 uncacheable file at 1 second = **2.45 seconds load time**.



At **North Ottawa County USD 239** web requests are typically twice as fast and as much as 14x faster from **CACHEBOX** than from the internet.

With 69% of web traffic served from **CACHEBOX**, the school could use an internet connection half the size. **This would save up to \$9,000 per year, freeing technology budget for student devices and content.**



*"I have been tech director at our school for twenty years and **CACHEBOX** is the best investment with the greatest outcome of any appliance I have ever purchased for the school. I am sure it has already paid for itself in saved bandwidth."*

**Louis Webb**, Technical Director, Nueces Canyon Consolidated ISD

**Isn't it time you found out what **CACHEBOX** can do for you?**

**appliansys**

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