

ARISTA

delivering clear advantage



BBC Production Village achieve an 8x increase in performance with Arista switches

Production Village Infrastructure

Located at the BBC's Bristol facility, the Production Village comprises 6 state-of-the-art ingest machines, 15 HD Final Cut Pro edit suites and an 84 TB Xsan. A powerful render farm attached to the Xsan can create blisteringly fast viewing copies of programmes in almost any flavour from DVD through to iPod-ready. An innovative production viewing gallery allows a Production Executive to assess the value of changes in an edit directly from his or her own office PC.

Project Background

The BBC Natural History Unit's (NHU) move from film to HD (High Definition) prompted a major review of the NHU post production strategy. It was clear that a smart and intuitive approach to high definition picture acquisition and metadata management was needed in order to meet the increasingly demanding 360° delivery requirements.

Identifying the Right Solution

The BBC Production Village retained Equanet, the specialist arm of leading IT vendor DSGi, to identify the optimum solution that provided the right mix of value and efficiency. Equanet's vendor neutral approach and extensive Partner Programme ideally qualified them to evaluate the available options and develop a bespoke solution specifically tailored to the BBC's requirements.

Having identified Panasonic's Varicam format, the search was on for a robust network infrastructure capable of delivering the metadata-rich solution that would allow full resolution editing to be undertaken early in the production process and excess material to be culled. To ensure that the bespoke solution matched performance expectations, Equanet installed a test solution.

10 Gigabit Network Switches

Equanet identified Arista Networks' non-blocking switches, with ultra low latency combined with high IO bandwidth, as the perfect fit for media post production environments. Capable of delivering higher throughput than Fibre Channel at a fraction of the cost, Arista's 10GbE switches deliver more than eight times the performance of 1Gigabit networking with much lower latency.

“ Successfully implementing 10GbE from Arista within the BBC Bristol Production Village provides the necessary foundation to deliver efficiency savings and cutting edge performance enabling BBC Bristol to meet it's broadcasting commitments. ”

*Sarah Wade, Project Manager
Production Village BBC Bristol*

About Arista Networks

Arista's pioneering range 10 Gigabit Ethernet (10GbE) switches are available in 24 and 48 port configurations; both in a 1U form factor, supporting both layer 2 and 3. They also feature LAG with LACP, which can aggregate multiple switches when a big IO stream is needed.

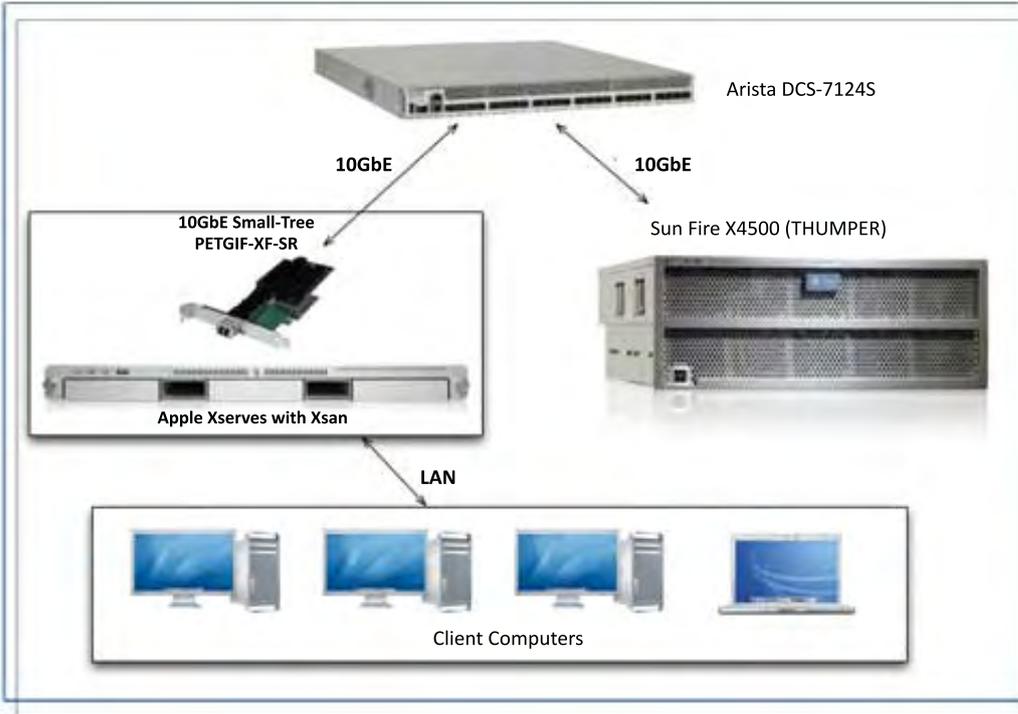
Arista's switches offer the breakthrough in price-performance that is making 10GbE a cost effective mainstream data centre solution.

About Small Tree

Small Tree is the de facto standard for 10GbE performance on Apple hardware. They develop bespoke firmware and drivers for 10GbE cards based on the Intel 10GbE chipset. Their cards offer either SFP+ copper or optical connection to Arista 10GbE switches

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The Specification

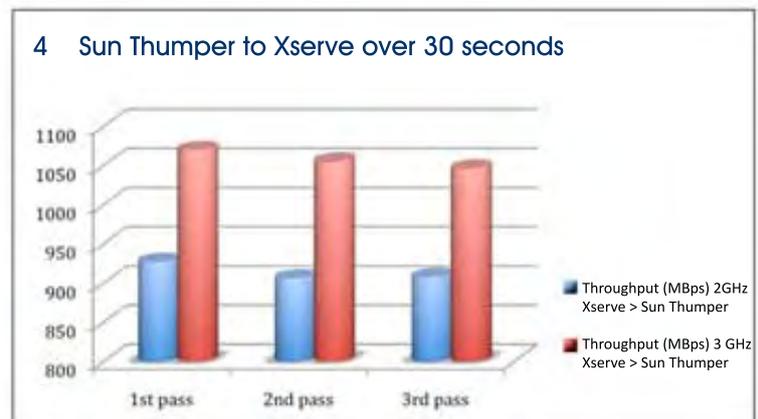
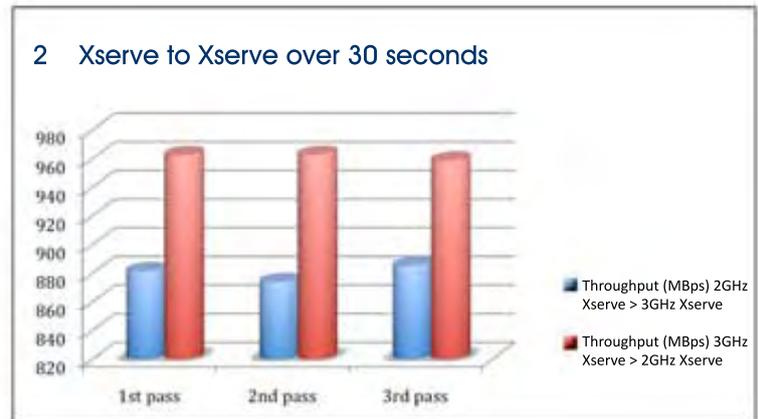
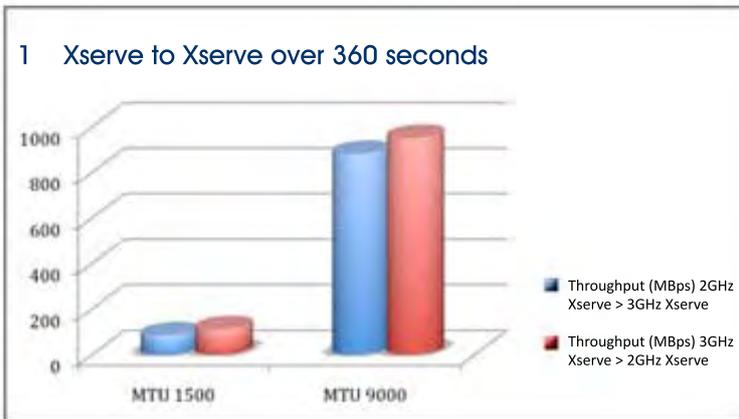


Given the limitations of Fibre Channel and 1 Gigabit based iSCSI storage systems, the BBC selected the Sun X4500 x64 based server (code name Thumper), which offers 2GB disk I/O per second using 48x 1TB disks at a cost of less than 1€ per Gb for the complete server.

Testing focused on measuring end-to-end network performance through the Arista DCS-7124S using netperf. Since the Apple Xserves, the Sun Thumper and the Arista switch are all Unix/Linux based, the administration of the entire network environment could be completely scripted, giving administrators the ability to manage their media infrastructure efficiently.

The Test Results

Testing was conducted between the Apple Xserves using an MTU of 1500 as baseline. Throughput between the Xserves and then between the Xserves and Sun Thumper was measured using an MTU of 9000. The results are shown below:



Results Analysis

The test results show that the Arista DSC-7124S, in combination with the Xserves and Sun 'Thumper' NAS, offers unparalleled performance that has not been seen before. Arista switches offer industry-leading performance with the highest 10 GbE port density seen in a 1U form factor, which cannot be found in competing 10GbE switch products.

Network performance is ultimately linked to the specification and configuration of the server hardware as well as the speed of the network adapter. It is evident from the results of the testing that the highest throughput can be achieved between the highest spec server hardware.

Who would benefit from 10GbE networks?

- ✓ Customers working with large files on the server
- ✓ Customers transferring video files to/from the server
- ✓ Larger servers with many users connected
- ✓ Multi server sites, all servers could be interconnected via 10GbE
- ✓ Customers using proprietary local SAN solutions can switch to standard file server
- ✓ TCP/IP protocols using AFP for Mac clients, and SMB/CIFS for Windows clients

Q & A

Will any server with 10GbE offer this great performance?

No. This also depends on the server, 10GbE adapters, the TCP/IP stack, operating system and the performance of the storage array.

Is 10GbE faster than Fibre Channel?

10GbE offers 5 times faster bandwidth than 2 Gigabit Fibre Channel and 2.5 faster bandwidth when compared to 4 Gigabit Fibre Channel. Another question is can the maximum Fibre Channel bandwidth be utilized by the RAID system and the server/workstations? The Sun X4500 system offers up to 2 GB (Gigabytes) disk I/O performance, which is 5 times better than 4 Gigabit Fibre Channel. Apple Xserve RAID offers about 130 MB/sec.

Is a network throughput of >1000 MBps good?

Yes, this is excellent and represents about 80% of the maximum theoretical bandwidth of 10Gbps. This also requires a multi-CPU server, fast storage, and a fast TCP/IP stack.

Is every 10GbE switch offering this level of performance?

No. Most switches only offer one or a few 10 Gigabit ports and many 1 Gigabit ports. Usually these switches cannot handle full 10 Gigabit traffic.

Will 10GbE fiber-optic crossover cables work?

Yes. A server can be directly connected to a workstation using a standard LC/LC cable. The LC/LC cable uses swapped transmit and receive wires by default.



Test Configuration

Server:

1 x Sun Fire X4500 running Solaris10 with Sun 10GbE network adapter (driver: ixgbe)

Clients:

1 x Apple Xserve (2 x 2 GHz Xeon Dual-Core) running Mac OS 10.4.11 with 10GbE Fibre network adapter (Small Tree: PETG1F-XF-SR)

1 x Apple Xserve (2 x 3 GHz Xeon Dual-Core) running Mac OS 10.4.11 with 10GbE Fibre network adapter (Small Tree: PETG1F-XF-SR)

Network:

1 x Arista DCS-7124S 24 port 10GbE switch with SFP+ fiber-optic SR adapters (The Arista DCS-7148S offers 48 x 10GbE ports)

2 x Intel based Small Tree 10GbE network adapters connected to the switch using 2m fiber-optic cables

1 x Intel based Sun 10GbE network adapter connected to the switch using 10m fiber-optic cables

All fiber connections were made using 62.5micron multimode fiber-optic cable.

Jumbo frames were configured on the switch and all hosts using an MTU of 9000.

Flow control was enabled on the switch and all hosts

Software:

Benchmarking was performed using netperf which is capable of measuring the performance of 10 Gigabit Ethernet. The commands used were: `netperf -H <host ip> -t TCP_STREAM -f M -C -c -l 30 -- -S 768k -s 768k -m 512k netperf -H <host ip> -t TCP_STREAM -f M -C -c -l 360 -- -S 768k -s 768k -m 512k`

Glossary

XFP

A 10GbE small form factor pluggable module. XFP cards and switches do not have a direct cable or fiber connection. Instead, an XFP transceiver is needed, e.g. an XFP optical transceiver with duplex LC fiber connector or an XFP copper-CX4 adapter. Some cards do not require an XFP and use an on-board fiber or copper connector.

SFP+

The same as XFP but with a very small form factor. Arista switches use the more advanced SFP+. These offer the lowest power consumption for 10GbE connectivity and backward compatibility with 1Gb SFP modules.

LC Fiber-Optic Cable

A small form factor fiber-optic cable connector used in SFP+ modules. These allow much greater port density than the older SC connectors. The LC connector has the additional benefit that both the send and receive cables are fixed in a single connector.

10GbE Media Types

10GBASE-CR	5m over copper twinax
10GBASE-LR	10km over SMF
10GBASE-LRM	220m over OM1/2/3 MMF
10GBASE-SR	300m over OM3 MMF
1000BASE-LX	10km over SMF
1000BASE-SX	275m over OM1 MMF
1000BASE-T	100m over UTP
10GBASE-SRL	100m Over OM3 MMF (Lower cost & Power Consumption)

All listed media types are supported via SFP+ modules using the Arista switch.

Jumbo Frames

This is an option to change the default Ethernet packet size to a higher value up to 9000 bytes. However, not every node is capable of supporting jumbo frames. It is best practice to use jumbo frames on storage networks. For other traffic (Internet, etc.) standard Ethernet ports can be used with an MTU of 1500.

PCI-Express

A modern PCI 64-bit slot system. Mac Pro systems offer PCI-Express slots.

PCI-X

A 64-bit PCI slot used in many systems. Note that the older Sun X4500 uses the PCI-X slot system. Newer Sun X4500 servers already use PCI-Express.

EOS

The operating system used in Arista switches. Command line and commands are similar to Cisco IOS.

Cut-Through Switching

"cut-through" is a switching method where the switch begins forwarding a packet before the entire frame has been received. Arista switches specify sub-microsecond latency for all packet sizes using cut-through switching.



Equanet

Equanet is the specialist channel of DSGi Business for large and medium sized managed customers and the public sector. We offer world-class eProcurement systems and excellence in account management. We work with corporate and public sector partners to identify, develop and deliver IT solutions.

Working in partnership with our corporate clients, we help them to identify possibilities and secure the best possible results from their IT spend.

About Consolidate IT

Consolidate IT is a value add Pan-European distributor specialising in 10GbE Networking, IP storage and HPC solutions.

We distribute and support a range of innovative 10GbE enabling products, from proven manufacturers including Intel and Arista Networks, that are delivering demonstrable performance gains, reducing energy consumption, driving down the cost of ownership and extending investment life cycle.

Our Channel Partners include many of the leading IT Vendors and Solutions Providers in the UK and across Europe who are seeking to ensure that their clients' infrastructure is ready for the 10GbE era.

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