Infrastructure	**BlackDiamond (2), Summit1 (2), Summit24 (5) and Summit48 (22) switches**
Management	**ExtremeWare**
Protocols	**IP**
Nodes	**Over 1000**
Servers and OS	**MicrosoftNT, Microsoft WindowsNT**

Case Study

Experience Music Project

From Gigabit to Gigabeat: Interactive Music Museum Relies on Extreme for Private Metro Area Network

Experience Music Project (EMP) in Seattle is an unique, interactive museum dedicated to exploring creativity and innovation in music. Visitors to the museum can view rare artifacts and memorabilia from a collection of more than 80,000 items, make their own music, explore various musical milestones within interpretive exhibits and learn about the history of music.

EMP was founded by investor and philanthropist Paul G. Allen, former Microsoft partner, under the direction of co-founder Jody Patton. Designed by renowned architect Frank O. Gehry, the 140,000 square-foot museum offers visitors a musical experience unrivaled anywhere in the world.

Jody Patton and Paul Allen

The network for the museum had to be powerful enough to deliver real-time CD-quality audio, bandwidth-intensive video, and detailed photos and graphics simultaneously to screens, kiosks, speakers and handheld devices for EMP's thousands of daily visitors. In addition, EMP's private metropolitan area network (MAN) spans four buildings in Seattle and the infrastructure had to support daily corporate mission-critical applications, including the museum's ticketing operations, point of sale (POS) communications and web site (www.emplive.com).

With Extreme Networks' broadband switching solution at the foundation of EMP's massive data infrastructure, the organization has been able to deliver the ultimate interactive music experience to visitors, while providing a bulletproof solution that supports its entire back-end business operation.

extreme networks

Powering the MAN

After evaluating products from leading switch vendors, EMP chose Extreme Networks for its high-performance broadband switching solutions which offer high availability, redundancy, resiliency, scalability and multimedia application support. Extreme supplied EMP with its BlackDiamond® core chassis and Summit® fixed-configuration switches.

Modular BlackDiamond 6808 switches sit at the core of the museum while Summit1™, Summit24™ and Summit48™ switches are deployed throughout the museum – at the network's edge – and at EMP's two other buildings in Seattle. Summit switches are also deployed at its co-location site.

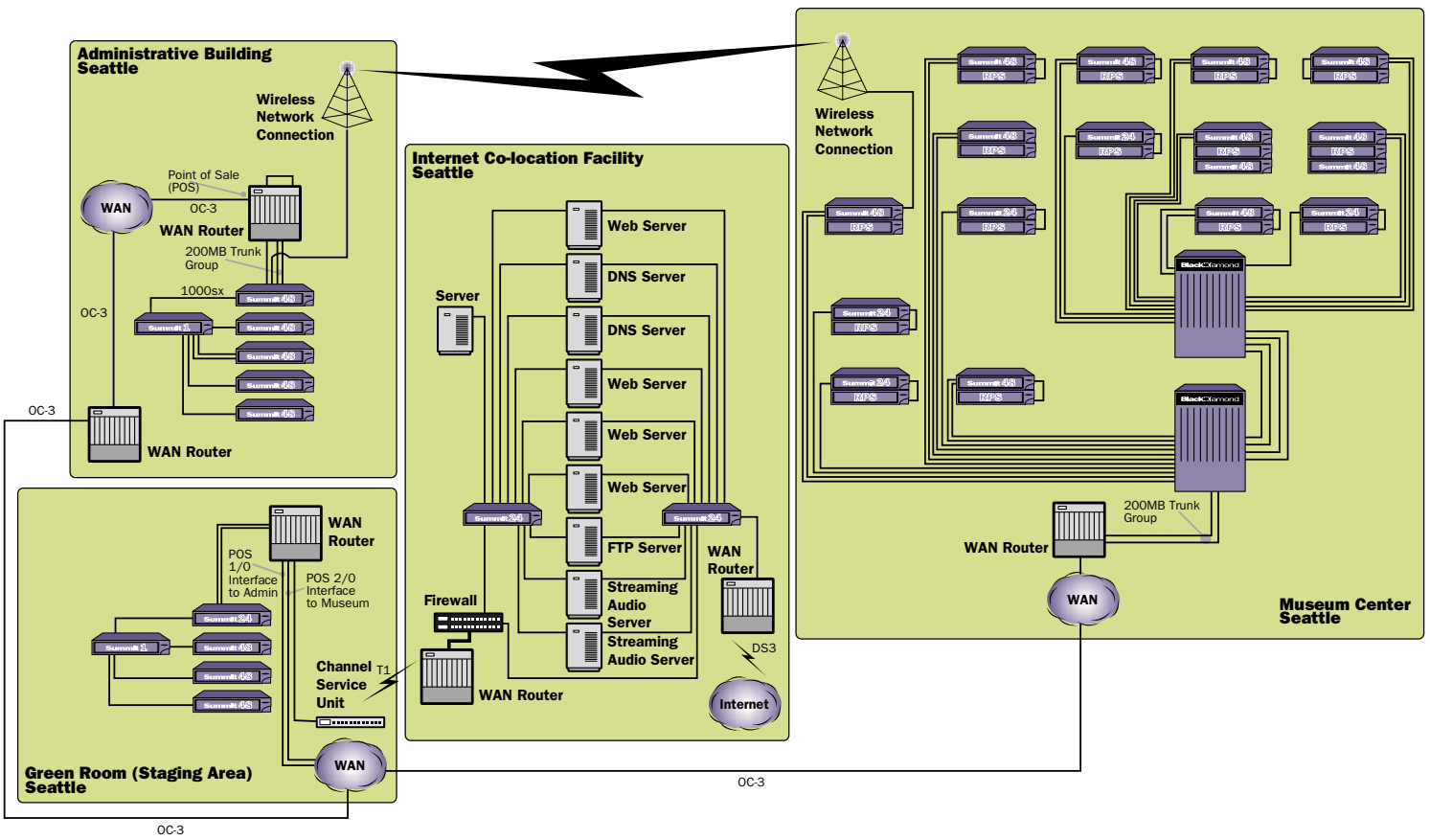
Extreme's BlackDiamond switches have 96 Gigabit Ethernet ports and offer carrier-class resiliency and fault tolerance. With 24 and 48 10/100 Mbps ports and dual Gigabit Ethernet uplinks, the non-blocking Summit24 and Summit48 switches offer wire-speed Layer 3 and Layer 2 switching. EMP is also using the ExtremeWare™ software suite, which includes standard protocols and Policy-Based Quality of Service (QoS) to manage bandwidth and prioritize traffic. The range of QoS profiles includes minimum bandwidth, maximum bandwidth and relative priority. Since the entire Extreme broadband switching solution shares a consistent hardware, software and management architecture, EMP's network is easy to manage and scale, while reducing the overall cost of network ownership.

EMP's private MAN encompasses the museum building, its co-location facility, its "green room" building or staging area, its warehouse and its administrative offices. The green room building is connected through Extreme switches over the MAN via OC-3 links to the administrative building and the museum. After new video and audio content is produced and encoded in the green room, it is pushed through the BlackDiamond switches to video servers in the museum.

Powering the Museum

EMP has deployed BlackDiamond, Summit24 and Summit48 switches along with a technology called CobraNet throughout the five-story museum. CobraNet was developed by Peak Audio and uses Fast Ethernet to distribute uncompressed real-time digital audio over a network. CobraNet implements a protocol that combines one or more channels of audio into an Ethernet packet and orchestrates data transmissions, which result in real-time performance and higher bandwidth utilization.

After EMP's audio content – either stored or real-time radio station feeds – and video content is sent from the green room building to servers in the museum via the BlackDiamond switches, it is delivered via CobraNet to more than 30 audio kiosks and 40 video screens dispersed throughout the museum.



Extreme's Policy-Based QoS allows EMP to assign top priority to its CobraNet content, which is run over virtual local area networks (VLANs). Using Summit switches on its VLANs, EMP's CobraNet traffic can be segregated from other data traffic in the museum.

In addition to setting high priority for the VLANs, EMP also applies high priority to its Digital Lab. This is a room in the museum where visitors can access more than 80,000 artifacts on workstations. These artifacts are also accessible online. EMP displays only about 2% of its artifact collection in the museum, but all of the artifacts are always available digitally – and visitors can zoom in on the digital photo files for ultra-fine details. Extreme's Policy-Based QoS allows EMP to assign high priority for this traffic since it is so bandwidth-intensive.

The Museum Exhibit Guide

"Two of the key features that helped us decide on Extreme Networks were the raw speed of the switches and the ability to do QoS," said Dave Leinweber, EMP's Director of Technology. "Also, Extreme has the only technology on the market that can handle the low latency requirements of CobraNet. We assign top priority to our three CobraNet based VLANs – the ones that run time-sensitive CobraNet – while setting a lower QOS for other VLANs which support our sales operations and museum operations. We also have the ability to shift things around in the system on the fly, which is important to us as we add new multimedia capabilities."

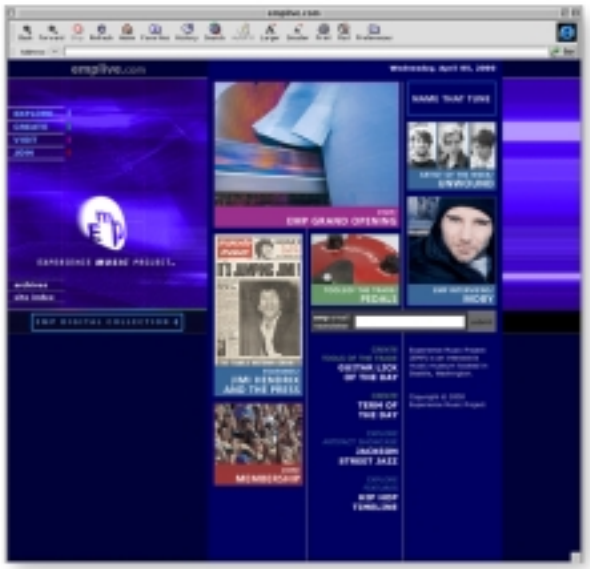
Northwest Passage Gallery

In addition to distributing high-quality audio, video and photos, Extreme provides EMP with a high-performance network infrastructure that provides high availability and resiliency for its other mission-critical applications throughout the museum, such as its point of sale operations, including ticket, food and retail sales.

"It is absolutely essential that we're up 24x7," said Leinweber. "Besides appreciating the Extreme solution for our exciting multimedia applications, we also value the reliability of the products for our point of sale operations. If the network went down, not only would we be unable to deliver the impressive audio and video content we're known for, but our ability to sell tickets, serve food at the restaurant or sell products out of the museum store would be impacted. These applications are obviously just as mission-critical for us, and our Extreme network has never let us down."

Extreme enables and connects EMP's interactive exhibits such as:

Sky Church Crossroads	**A consummate and visually dramatic gathering place for experiencing music. The main exhibit area in EMP combining rare artifacts with imagery and multimedia to recount stories spanning a century of American popular music.**
Sound Lab	**A futuristic studio where participants interact with music by singing, playing guitars, drums or keyboards.**
Digital Lab	**A repository of information, images, audio and video available on workstations in EMP and online via www.emplive.com.**
Performance Stages	**Performance areas designed for intimate performances, guest lectures, special video and film series, master classes and performing art productions.**



EMP's Web Site

Powering the Web Site

Extreme is also powering EMP's web site, EMP online (www.emplive.com). It's the web version of the museum and it offers the same highly sophisticated and state-of-the-art interactive capabilities to people who are not able to visit the museum in person. Online visitors can view mini-documentaries, listen to various artists discuss their musical influences and histories, view photos of the more than 80,000 EMP artifacts, view interactive instrumental instruction and more. For its web site, EMP is using a number of Summit24 fixed-configuration switches.

Powering the Corporate Network

Extreme's Summit1, Summit24 and Summit48 switches are deployed in the EMP corporate network for email, Internet connectivity, payroll and other mission-critical business applications. The Summit1 switches provide EMP with a single aggregation point at its green room building and administrative building. Extreme's Summit1 is an eight port gigabit-to-gigabit switch with Policy-Based QoS, a 17.5 gigabits per second non-blocking switch fabric and wire-speed IP routing.

And finally, EMP cites Extreme's knowledgeable and responsive service and support organization as an additional benefit to its decision. "Whenever we are planning changes or request some input, Extreme responds immediately and the engineers are fantastic," said Leinweber.

Powering the Future

Extreme's broadband switches offer high-performance, simplicity, scalability, flexibility and policy-based management capabilities, giving customers like EMP room to grow in addition to providing bandwidth provisioning tools to handle mission-critical applications well into the future. EMP plans to continue working with Extreme Networks for future network infrastructure enhancements.

Roots and Branches Sculpture

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