Musical Developments on Internet2
Where We've Been, Where We're Going

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Musical Developments on Internet2

Where We've Been.
Where Are We Going?

The high-bandwidth capabilities of Internet2 have finally allowed the Fine Arts to participate in the benefits of the Internet Revolution.

Music Uses of Internet2

- Teaching/Master Classes

- Rehearsal Preparation

- Distribution of Live and Pre-Recorded Music and Concerts

- Multi-Venue Recording and Collaboration

- Shared Research

Concerns

- Technology must be a viable and effective music-making and teaching tool

- Technology should make the job better and/or easier

- Technology should not be used just for the sake of using technology

Requirements

- High-Quality, True-Fidelity Audio

- High-Quality Video

- Real-Time Interactivity

- Ease of Setup and Operation

- Cost Effectiveness

- Collaborative Partners

High-Quality, True-Fidelity Audio

- Stereo Audio

- Accurate Representation of Sound

- No Echo

High-Quality Video

- Clear Picture

- Color Accuracy

- Full-Motion

- Stable Image

- Audio/Video Synchronization

Real-Time Interactivity

- Minimal Encoding/Decoding Delay

- Minimal Network Delay

- Accurate "Lip-Synch"

Ease of Setup and Operation

- Hardware Easy to Set Up

- Software Easy to Use

- Minimal Number of Operators

Cost Effectiveness

- Costs less than meeting in person

- Multiple uses for the same equipment

- More Efficient Use of Time

Collaborative Partners

- Compatible Equipment

- Compatible Interests

- Joint Projects

MPEG-2 Codec Strengths

- CD-Quality Audio
  - Stereo
  - 44.1 kHz Sampling Rate
  - 16 Bit Sampling Width

- MPEG-2 Video
  - DVD Quality Video
  - 30 Frames Per Second
  - Good Audio/Video Synchronization

MPEG-2 Codec Strengths (cont.)

- Approximately 100 - 250 ms. Delay

- Connects to 100Mb Ethernet via TCP/IP

- Controller Software is Easy to Operate

- Units Cost Between Approximately $20,000 and $50,000

- Number of Units Growing

MPEG-2 Codec Weaknesses

- Hardware and/or Software Often Difficult to Configure

- Local Network Infrastructure Usually Needs Reworking

- Incompatibility Between Manufacturers

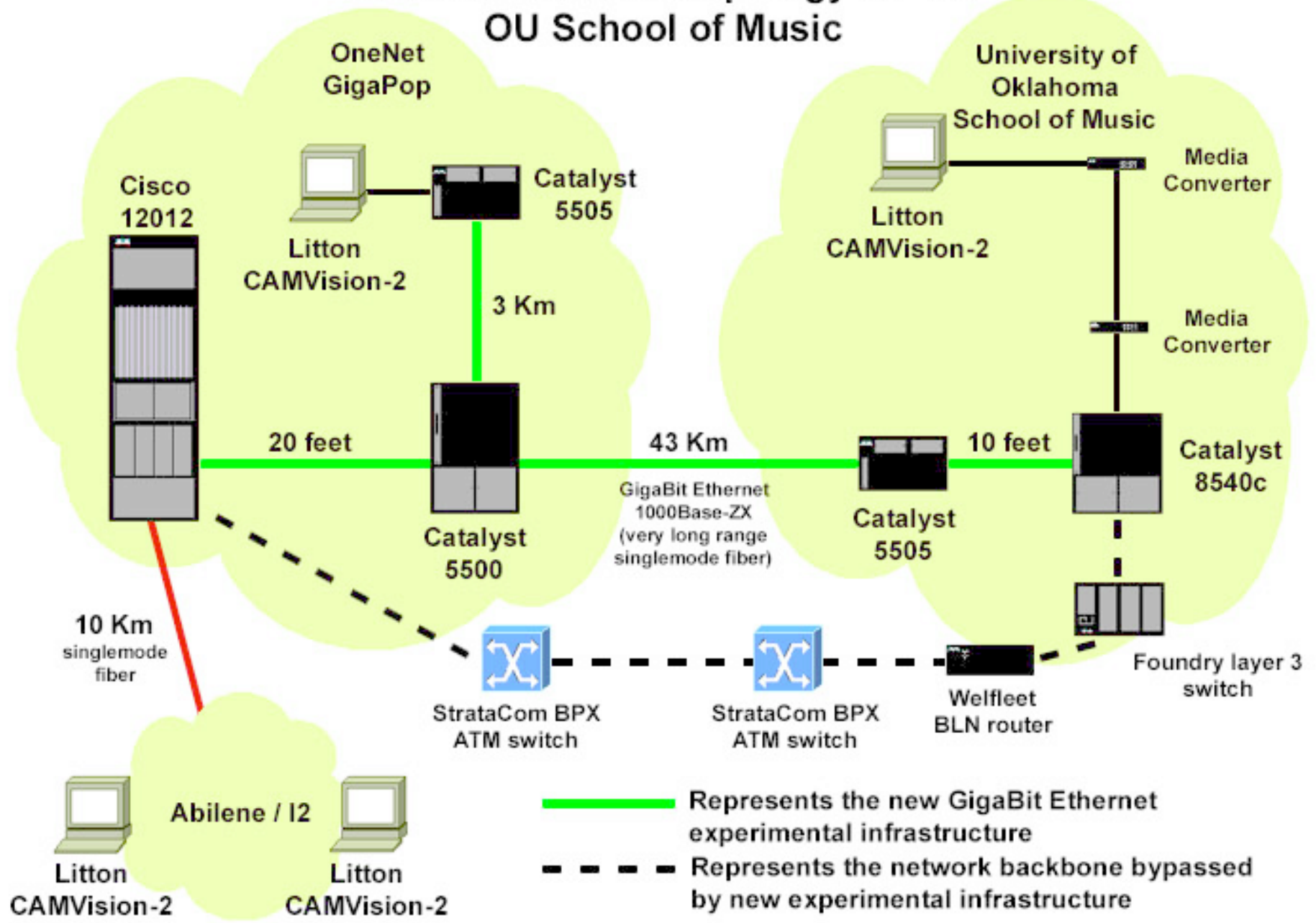- "Real-Time" Streaming Makes Unit Susceptible to Network Delays

Modifications to MPEG-2 Codec

- Second Video Monitor

- Bypass Echo Cancellation

- Studio-Quality Directional Microphones

- Audio Mixer

- High-Quality Audio Monitors

- Streamline Network

Internet2 Network Topology for the OU School of Music

OneNet
GigaPop

University of
Oklahoma
School of Music

Cisco
12012

Litton
CAMVision-2

Catalyst
5505

Media
Converter

Litton
CAMVision-2

3 Km

Media
Converter

20 feet

43 Km

10 feet

Catalyst
8540c

Catalyst
5500

GigaBit Ethernet
1000Base-ZX
(very long range
singlemode fiber)

Catalyst
5505

10 Km
singlemode
fiber

Foundry layer 3
switch

StrataCom BPX
ATM switch

StrataCom BPX
ATM switch

Welfleet
BLN router

Abilene / I2

Litton
CAMVision-2

Litton
CAMVision-2

⎯⎯⎯⎯ Represents the new GigaBit Ethernet
experimental infrastructure

− − − − Represents the network backbone bypassed
by new experimental infrastructure

Session In Progress

Video Monitors

Music on Internet2

Where Do We Go From Here?

For More Information

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