

# Cisco, NEC, PictureTel and Science Dynamics Deliver



## Case Study of H.320 Videoconferencing over Frame Relay for The World Bank



**NEC**



PictureTel

scidyn™

# What is the World Bank?

In the increasingly connected and rapidly changing global economy, the World Bank offers loans, advice, and an array of resources to more than 100 developing countries. It does this in a way that maximizes the benefits, and cushions the shocks, to poorer countries as they play a greater part in the world economy. The World Bank uses its money and staff, and co-ordinates with other organizations, to individually help each country towards stable and equitable growth. The main focus is on helping the poorest people and the poorest countries, but for all its clients the Bank emphasizes the need for:

- Investing in people, particularly through basic health and education
- Protecting the environment
- Supporting and encouraging private sector development
- Strengthening the ability of the governments to deliver quality services
- Promoting reforms to create a stable macroeconomic environment

The World Bank is the largest provider of such development assistance, committing about \$20 billion in new loans each year. However, it is not the only provider and the Bank also plays a vital role in co-ordinating with other organizations to ensure that resources are used to full effect.

## Technology Requirements

The basic requirement was for an integrated voice, data and Video network for developing countries using widely available technology. The economy of sharing voice and data on the same circuit has been widely accepted and is now second nature to many international companies.

The diverse geographic nature of the World Bank presented some major technical challenges to the network design. Many of the remote locations were in less developed countries with

equally less developed communications infrastructure. In many cases the only reliable communications link was via satellite; a factor that would further influence the network design. Given the competitive nature of the World Bank's business, costs had to be minimized. Most traditional approaches would either have relied on communications facilities that would not have been prevalent in the target countries or resulted in the use of multiple technology solutions. The latter case would have inevitably raised the costs as duplication and redundancy would have been introduced.

However, a key technology requirement for the World Bank was to integrate its existing video conferencing facilities, the PictureTel Concorde Video Codec system. For some time the Bank has been searching for a flexible and simple method of combining video with its data requirements over a shared circuit. The key issue here is that video is bandwidth hungry, requiring 64Kbps or 128Kbps as a minimum in most cases. To reserve this sort of bandwidth on a satellite circuit for an occasional use is extremely costly. In many of the more remote locations the natural alternative of using ISDN was not available.

With Science Dynamics' (SciDyn) technology it was able to add Video over Frame Relay as an extension to its existing Voice/Data FRADs.



“By implementing a solution that efficiently transports Data, Voice and Video traffic using its existing Frame Relay network the World Bank has made innovative strides towards convergence.”

# Technology Solution—Video over Frame Relay

To better understand the Bank's solution, it is important to understand the basic technology behind implementing Video over Frame Relay.

The basis for almost all Videoconferencing is H.320. The International Telecommunication Union (ITU) standards organization developed H.320 which defines coding, framing, signaling, call setup and establishing connections for videoconferencing. It applies both to point-to-point and multipoint videoconferencing sessions. Furthermore, H.320 provides interoperability between different compression decompression (CODEC) manufacturers. CODEC manufacturers including PictureTel (as used by the World Bank) have implemented this standard into its products.

Frame Relay is a packet switching technology that allows variable length packets to co-exist with time sensitive applications on one common network link. It uses virtual circuits (VCs) to establish a communication path between customer sites, normally using a Frame Relay Access Device (FRAD) or remote office router. Video is application sensitive to delay and, unlike time division multiplexing (TDM) which permanently pre-assigns bandwidth, Frame Relay uses a committed information rate (CIR) that guarantees delivery of packets and ensures the required level of end to end performance. However, the major benefit Frame Relay has over ISDN is cost, allowing voice, data, fax and video to share the same link, thus eliminating the requirement to dedicate separate bandwidth for each application.

Delays could result in dropped packets that would effect voice and video quality. Whilst delays cause little appreciable drop in quality to most data applications; even a small delay or variance in delay can render time sensitive applications unusable.

Another feature that can strengthen the case for Frame Relay is multicast. Most Frame Relay switch manufacturers support multicast DLCIs. This is needed to duplicate data to multiple locations that have been selected to receive the information. Videoconferencing can take advantage of this service with applications (e.g. broadcasts) that needs information to be sent out to multiple sites without a reply.



“Alliances such as this are fundamental in proving our element of the complete multi-service solution.”

# Product Set

The answer, therefore, was to adopt a packet based technology that could share the bandwidth on an "as needed" basis. The net effect of this was to create a pool of bandwidth that was available to all applications, but could be dynamically and automatically shared between them. The Bank saw Frame Relay as the technology of choice, providing a relatively low over-head, with a large range of proven multi-media access devices available.



## Video Equipment

PictureTel's Concorde Videoconferencing systems are heavily used throughout the Bank, and in many cases were already present in the remote branch locations.

*"By implementing a solution that efficiently transports Data, Voice and Video traffic using its existing Frame Relay network the World Bank has made innovative strides towards convergence. The network fully supports such content-rich services as videoconferencing and makes the most of existing bandwidth so that the Bank is able to provide cost-effective multimedia communications tool to its remote locations"*

**Mark Thompson, PictureTel Corporation, Product Marketing Manager, Network Systems.**

## H.320 over Frame Relay Converter

The chosen solution for converting H.320 video to Frame Relay (or integrating H.320 video over Frame relay) was SciDyn's VFX-250S; a unique and easy-to-control product specifically designed for the task of transporting continuous data bit-streams (like

video) over Frame Relay. What was unique to the SciDyn's solution was the ability to combine video traffic with conventional Frame Relay data traffic. Conventional video transmission solutions required a "bandwidth pipe" (normally a leased line or ISDN service) to provide a dedicated path. The VFX-250S proved to be the ideal solution by enabling its existing PictureTel CODEC to interface to its existing Cisco access solution.



*"Alliances such as this are fundamental in proving our element of the complete multi-service solution. A prestigious customer, such as the World-Bank, increases the validity of 'real-life applications' and the awareness of this technology in the Market."*

**Joy C. Hartman, President and Chief Executive Officer, Science Dynamics Corporation**

## Frame Relay Access

The Cisco MC3810 Multiservice Access Concentrator was chosen as the platform for integrating Voice, Video & Data over Frame Relay at each location. The Cisco MC3810 combines switched integrated access for voice, LAN traffic, and legacy data over Frame Relay at speeds of up to T1/E1.

One of the challenges faced in combining the rigorous needs of video transmission with a frame-based technology is to provide predictable Quality of Service (QoS). The architecture of the Cisco MC3810 enabled the video traffic to be prioritized over less demanding data applications where network latency would be less critical.

Another key design feature was the end-to-end buffer management of the VFX-250S that enabled two such devices to manage the resources to maximize the video quality a factor critical to the success of any video conferencing application.

# Alliance for Success

The successful implementation of the network depended not only on the right technology but also the partnership between technology companies. In addition to the role played by SciDyn and Cisco in providing the networking technology, there were two other organizations involved.

PictureTel, as the provider of the Concorde Video Codec system played an integral part in the overall technology system.

Founded in 1984, PictureTel Corporation is the world leader in developing, manufacturing and marketing a full range of videoconferencing solutions. The company's systems meet customers' videoconferencing needs from the desktop to the boardroom. PictureTel also markets network conferencing servers and a comprehensive portfolio of enterprise-wide services. The company provides complete videoconferencing solutions to customers in a wide variety of industries.

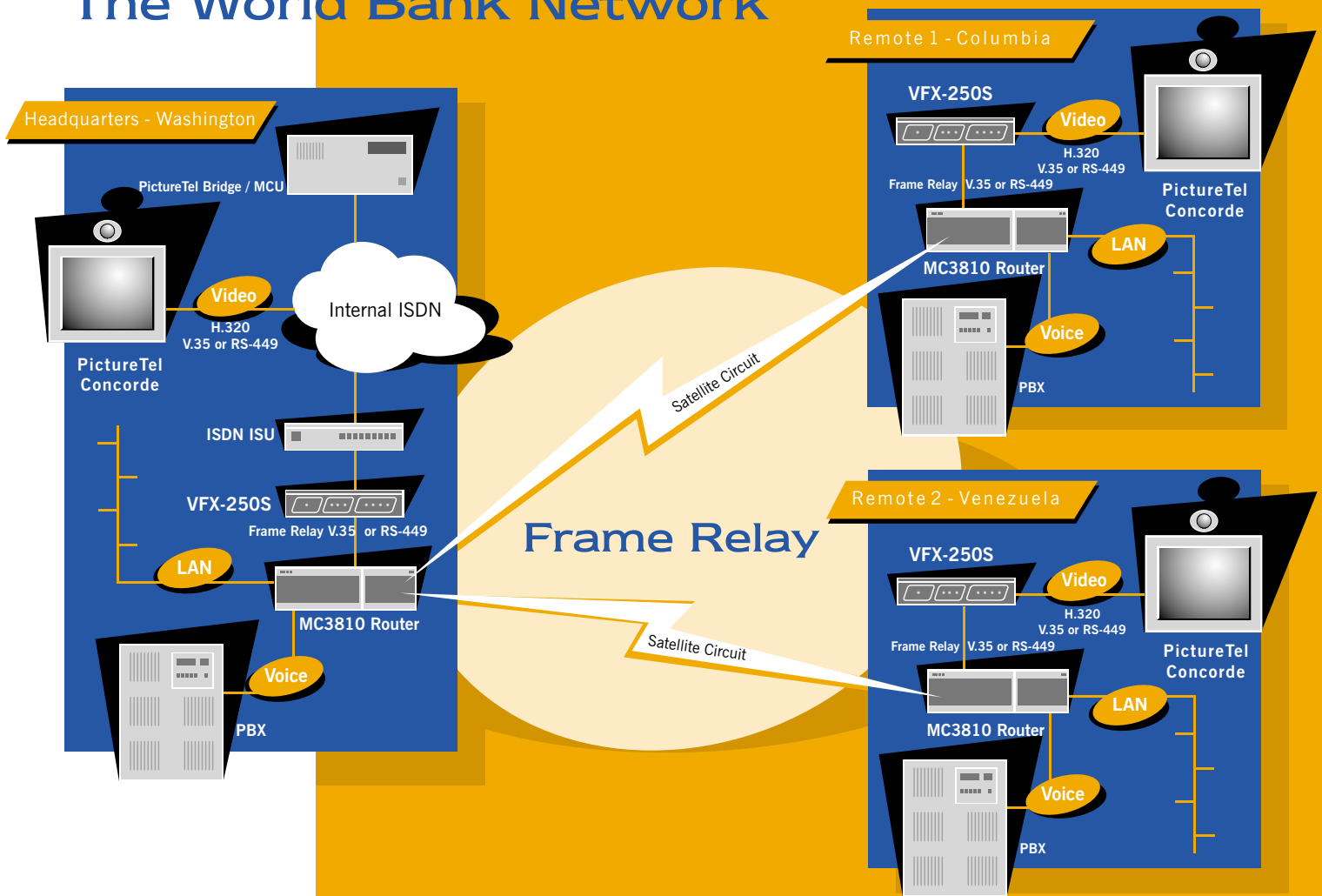
Lastly, the World Bank chose NEC Business Network Solutions, Network Integrator Group (BNS NI) as the integrator for its network. Based in Redwood City, California, BNS NI specializes in full life cycle support for multi-vendor complex networks. The bank chose BNS NI as it offered the integrated network backbone, configured, supplied, implemented, and supported by a unified team of experts who work as one. The single source offered by BNS NI ensured that the World Bank was working with an integration partner that would take full responsibility and provide complete accountability for its performance—with one phone call.

💧💧 We look forward to extending this network and promoting this type of solution to other customers. ””

*“As a solutions provider, we are very excited to be able to provide this advanced multi-service packet based network, including all elements of voice, data and video enabled by the combination of the Cisco MC3810 and the Science Dynamics VFX-250S. We look forward to extending this network and promoting this type of solution to other customers”*

**Kevin C. Gormican, Vice President - NEC Business Network Solutions, Inc”.**

# The World Bank Network



To illustrate the network, an example is shown above of two remote locations being connected back to the World Bank headquarters in Washington, DC, USA. In reality, the network consisted of many such locations connected back in this manner.

*"The use of Science Dynamics' VFX-250S, Video FRAD, enabled us to seamlessly integrate Videoconferencing to remote branches over the existing Frame Relay infrastructure. This, combined with the voice & data integration provided by Cisco, provided not only the best cost model, but a very flexible use of the bandwidth".*

**Hajrudin O. Beca- Head of Videoconferencing services, The World Bank Group.**

# Summary

The World Bank network illustrates a number of important factors. Firstly, it is a practical example of an international network where Frame Relay has been used for real-time multimedia applications. Furthermore, it demonstrates that videoconferencing can be added to an existing network's capabilities in a cost-effective manner and without the need for additional communications services. The ability to integrate voice, data and video applications on the same network has led the World Bank to provide a cost-effective communications facility to its remote locations whilst providing the flexibility of having the network balance the use of bandwidth between the applications. At times of the day when the video requirements are low, it enables more bandwidth to be used for data applications and vice versa.

By deploying the VFX-250S, the video interface to the network is future-proof. This is because the VFX-250S will interface to any H.320 Video Codec.

When providing communications to regions of the world where the local population has to live on no more than \$1 a day per head, low cost of deployment and optimal running costs are vital. The partnership between SciDyn, Cisco, ENS and PictureTel provided the World Bank with the economic solution that it needed for their integrated multi-media communications—globally.

Science Dynamics Corporation  
2059 Springdale Road, Suite 100  
Cherry Hill, NJ 08003  
USA  
Tel: 1-856-424-0068 Fax: 1-856-751-7361  
E-Mail [sales@scidyn.com](mailto:sales@scidyn.com) Web: [www.scidyn.com](http://www.scidyn.com)

Cisco Systems Inc  
170 West Tasman Drive  
San Jose, California 95134  
USA  
Tel: 1-408-526-4000  
Web: [www.cisco.com](http://www.cisco.com)

NEC Business Network Solutions, Inc.  
370 Convention Way  
Redwood City, California 94063  
USA  
Tel: 1-301-858-7068 Fax: 1-301-858-7068  
E-Mail: [jaypt@earthlink.net](mailto:jaypt@earthlink.net) Web: [www.ens.com](http://www.ens.com)

PictureTel Inc  
100 Minuteman Road  
Andover, Massachusetts 01810  
USA  
Tel: 1-978-292-5000 Fax: 1-978-292-3303  
E-Mail: [nbird@pictel.com](mailto:nbird@pictel.com) Web: [www.picturetel.com](http://www.picturetel.com)



Science Dynamics Corporation (SciDyn) is dedicated to developing and globally marketing innovative quality products, integrating technology to create solutions to meet the challenges associated with the transition from circuit switched transmission to the digital packet based communication environment. We will continually strengthen our position by aggressively pursuing additional market opportunities and establishing strategic alliances that complement and expand our core capabilities. We will drive our success by capitalizing on our market knowledge, anticipating our customer requirements and continuing to explore potential new applications and products. These strengths and our commitment to quality will be our global platform for future growth.