

HHS Net

IHS Briefing

November 20, 2003

HHS Net

- The overarching goal of the HHS-Net initiative is to implement an HHS network that
 - ◆ Supports enterprise i.e. HHS-wide, applications,
 - ◆ Provides a robust network
 - ◆ Is secure,
 - ◆ Is reliable, and
 - ◆ Provides interoperability among the OPDIVs

HHS IT Strategic Plan Alignment

IT Goals	IT Objectives	Description of Alignment
<p>Goal 3 Implement an enterprise approach to IT infrastructure and common administrative systems that will foster innovation and collaboration.</p>	<p>Objective 3.1 Establish a basis for consolidated infrastructure to achieve interoperability and communication among operating divisions.</p>	<p>Building a unified network that will support HHS enterprise applications.</p>
	<p>Objective 3.2 Improve the performance of HHS' communication network resources.</p>	<p>Providing a high-speed network infrastructure linking OPDIV network resources.</p>

Business Needs Analysis

- Current network consist of standalone OPDIV dedicated networks typically arranged in “hub and spoke” topologies
- A full mesh backbone network is required to support:
 - ◆ Enterprise applications
 - ◆ Disaster recovery and COOP
 - ◆ Increased reliability and flexibility
 - ◆ Enterprise security policies and implementation

High Level Department Wide Requirements

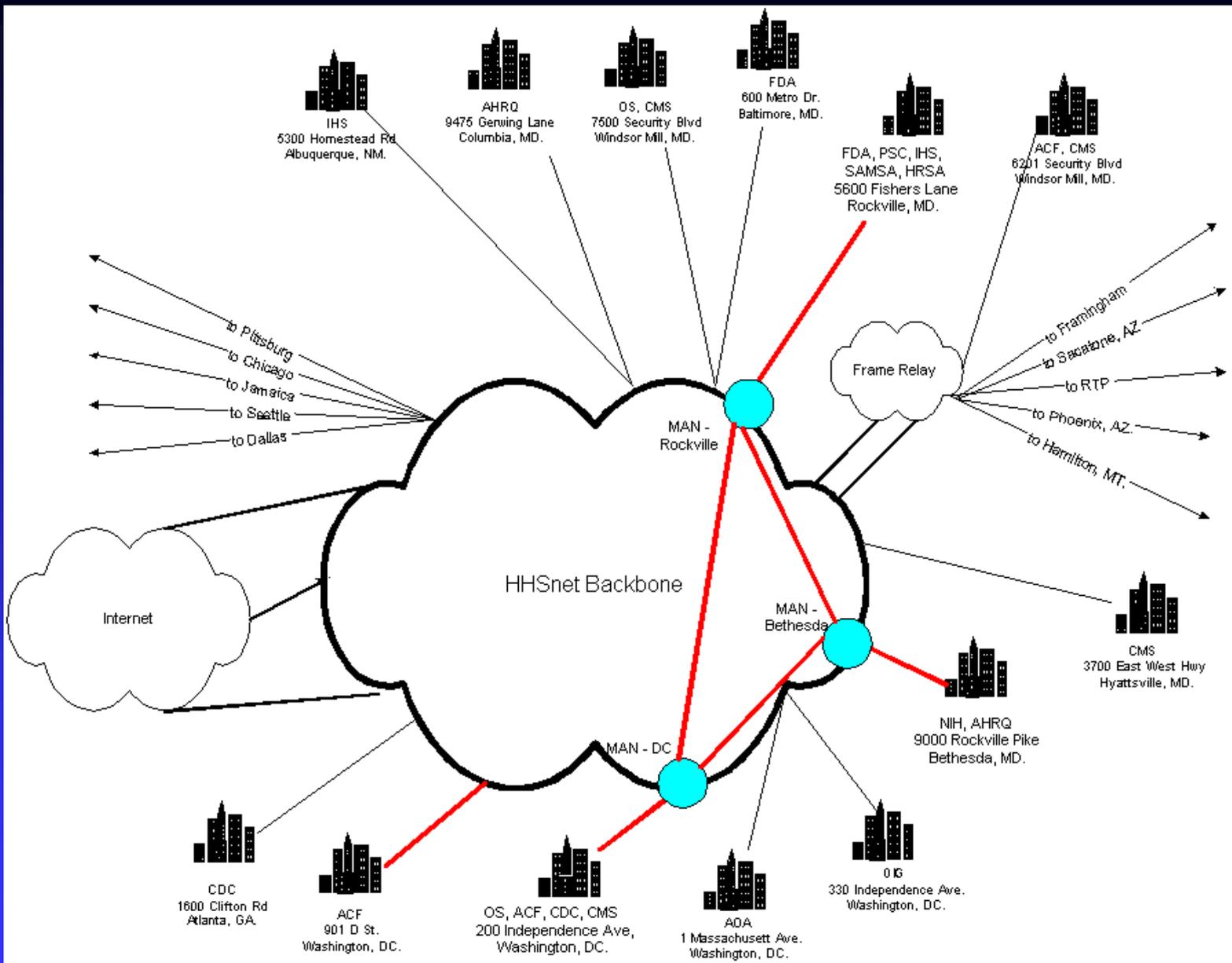
- Secure networking environment
- High reliability
- High performance
- Provide an efficient and effective growth path
- HHS and OPDIV management capabilities
- Potential to consolidate resources

HHS-Net Principles

- HHS-Net should provide back up and fail over redundancy that is at least equivalent to the current network
- HHS-Net should support all of HHS through multiple shared Internet connections
- HHS-Net should allow consolidation of circuits where practical
- The HHS IT Service Center will manage and operate HHS-Net at the Department Level and coordinate with OPDIV network managers and MCI
- All OPDIVs will adopt HHS-Net best practices
- HHS-Net will support OPDIV security requirements as well as comply with the security initiatives of the Enterprise IT Strategic Plan and the HHS Security Working Group guidelines

HHS-Net Access Model

- HHS-Net incorporates direct connectivity to the backbone where appropriate, but allows sites to connect to HHS-Net via frame relay managed gateways where lower speed connections are required. This model:
 - ◆ Does not require point-to-point circuits, eliminating long haul costs
 - ◆ Allows circuit consolidation at collocated sites
 - ◆ Will allow Internet connections through the HHS-Net backbone



Network Managed Services

- Reduce, but not eliminate, the number of personnel engaged in managing the entire network
- Leverage the strength of the vendor's experienced technical and consulting staff
- Obtain higher level of network security and a higher availability,
- Allow the HHS internal IT staff more time to focus on strategic initiatives
- Manage all stages of the HHS-Net equipment lifecycle-from provisioning, installation, and testing to ongoing maintenance and problem resolution
- Provide round-the-clock vendor support
- Provide round-the-clock access to network operations and technical support

Security

- The HHS-Net Implementation Team is working with the Department Information Systems Security Officer and the OPDIV ISSO's to complete the necessary HHS-Net security policies and procedures.
- Specific elements of the security plan include:
 - ◆ Fund HHS-Net implementation and the development of security policies through the HHS IT Security and Innovation Fund.
 - ◆ Ensure that applications that use the network will be compliant with FISMA, OMB and NIST guidelines.
 - ◆ Verify that OPDIV applications and systems that use the network and that these applications/systems have or will will have up-to-date security plans and controls.
 - ◆ Leverage current HHS and OPDIV security awareness training to ensure that users are being trained on the security principles behind the applications and systems that use the network.
 - ◆ Use the HHS and MCI incident detection and reporting capability manage security incidents and to report to FedCIRC.

Implementation Schedule

- The detailed implementation schedule will be developed by each OPDIV and will be coordinated by the HHS-Net implementation team.

Very-High-Performance Backbone Network Service – vBNS+

HHS Enterprise Solution

- A complete telecommunication business solution – Data, Voice & Video
- A secure, reliable, scalable, manageable, standards based, high performance, cost effective applications support platform
- Leverage convergence where possible, practical and affordable
- Maintain particular focus on the security requirements of the agency(s) and the Department
- Recognize that certain legacy needs will still be satisfied with legacy solutions
- Provide maximum visibility into the performance of the enterprise
- Position Department to realize additional cost savings through aggregation and consolidation of services

vBNS+ Offerings

- ◆ Nationwide IP Network
 - ◆ Private OC-48 (2.4 Gbps) Packet-over-SONET infrastructure
 - ◆ Separate from the public Internet
- ◆ Advanced IP Services
 - ◆ High-performance intranets and provider-provisioned VPNs
 - ◆ IP Multicast
 - ◆ IPv6
- ◆ High performance metrics and network visibility

Connection Types

- Direct connections to vBNS+ network range from T-1 (1.5 Mbps) up to OC-12c (622 Mbps)
 - ◆ T1 (PPP, FR, or ATM)
 - ◆ NxT1 (MLPPP or MLFR)
 - ◆ DS-3 (PPP, FR, or ATM)
 - ◆ OC-3c (PPP, FR, or ATM)
 - ◆ OC-12c (PPP, FR, or ATM)
- Indirect access also available through MCI's Frame Relay network
 - ◆ Sub-T1 rates available

MPLS – Multi-Protocol Label Switching

- MPLS provides *Label Switched Paths* to overcome the destination-based forwarding limitation of IP.
 - ◆ MPLS Applications:
 - ◆ Traffic Engineering - superior to ATM and other technologies
 - ◆ Fast restoration
 - ◆ Multi-service, multi-protocol integration
 - ◆ Virtual Private Networks (RFC 2547 and L2VPN)
 - ◆ Quality of Service
 - ◆ vBNS+ MPLS deployment completed 1Q2000.

High-Performance Intranets

- Private networking provided through a combination of tools:
 - ◆ Segregated control traffic
 - ◆ Closed route distribution (using BGP authentication on BGP peering sessions)
 - ◆ BGP route filters inbound and outbound
 - ◆ Segregated data traffic
 - ◆ Ingress/egress packet filters on every HHS-facing interface
 - ◆ Packet encryption devices at the edges
- NMCI (Navy Marine Corps Intranet) uses the vBNS+ network in this manner

VBNS and Frame Relay Security

- ◆ Authorization and non-repudiation of usage
 - ◆ Extensive denial-of-service protection capabilities
- ◆ Capacity measurement and management
 - ◆ Constant network utilization monitoring
- ◆ MCI router management through secure and encrypted channels only
- ◆ Auditing and incident detection
 - ◆ Security alarms and audit trails
 - ◆ Authentication of routing protocols
 - ◆ Extensive logging of filter and policy violations
- ◆ End-to-end control of the network by one entity with one set of policies

Performance Monitoring

- Very highly instrumented network
- Passive Measurement
 - ◆ Extensive SNMP polling of all backbone elements.
 - ◆ Custom-built traffic monitors used to report on traffic usage and profiling. (Packet contents are never examined.)
- Active Measurement
 - ◆ Dedicated performance testing platforms deployed throughout network.
 - ◆ Periodic test traffic streams measure loss, delay, and jitter.
 - ◆ Both unicast and multicast tests.
 - ◆ Web browser interface

vBNS+ Backbone SLA

- ◆ 100% backbone availability
- ◆ < 0.001% packet loss
- ◆ < 95 ms round-trip time
- ◆ < 0.15 ms jitter
- ◆ Supported by extensive measurement instrumentation
- ◆ On-line near real time reporting

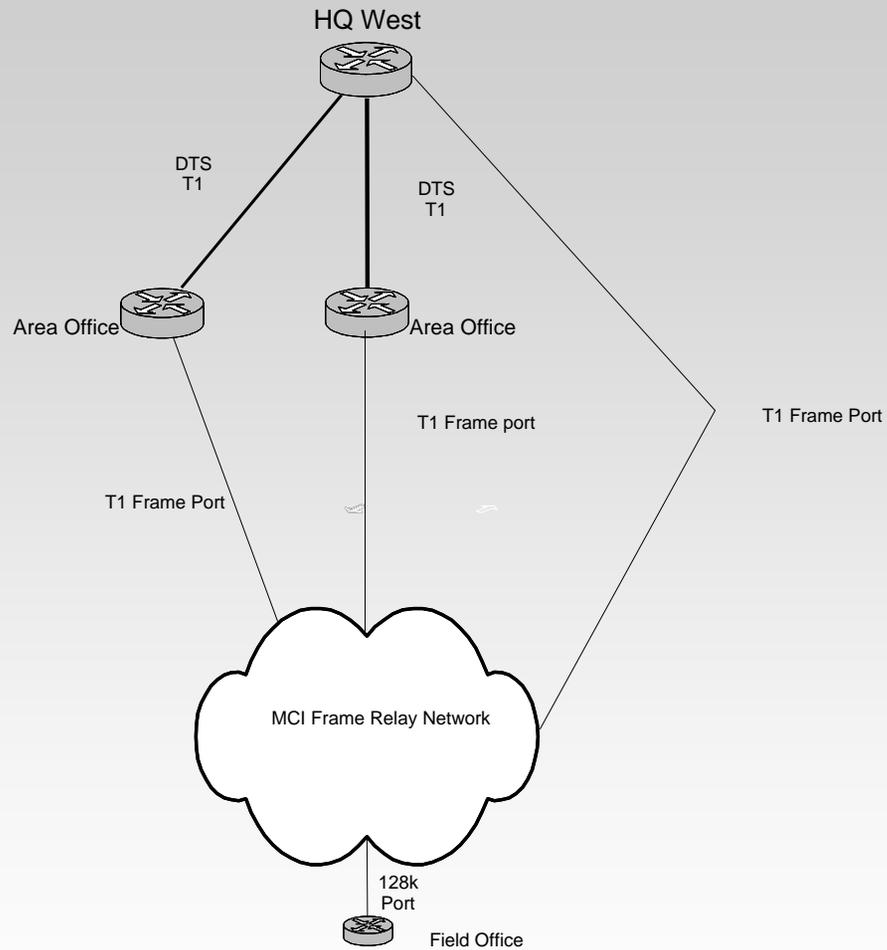
Frame Relay

- Instantaneous, Unlimited, Continuous Bursting
- Engineered for Low Average Backbone Utilization
- Standards-based backbone (OSPF)
- Fast Network Convergence and Recovery
- No Practical Limits to Network Scalability
- Port speeds from 56/64 Kbps to 45 Mbps
- MCI owned access in over 100 U.S. cities

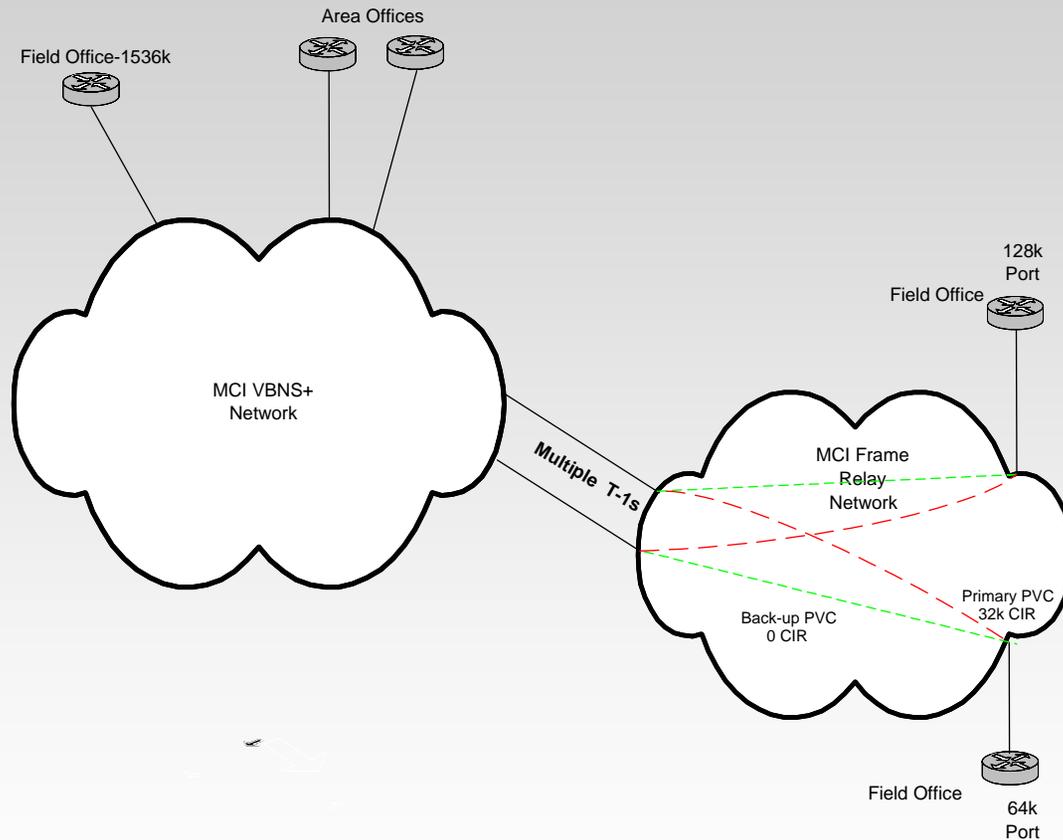
Benefits to IHS

- Tighter security
- Managed Frame-to-VBNS gateways
- Incremental access capacity
- Full mesh of connectivity across all of IHS
- Restoration paths for all Frame connections
- Unprecedented network monitoring capability
- Enhanced performance with increased SLA
- No practical limit to scalability
- Low/no service impact during migration
- Capability for VoIP & other initiatives
- Multicast & IPv6 support (Teleradiology)

Current IHS Network Design



New IHS Network Design



IHS Current MCI Order Status

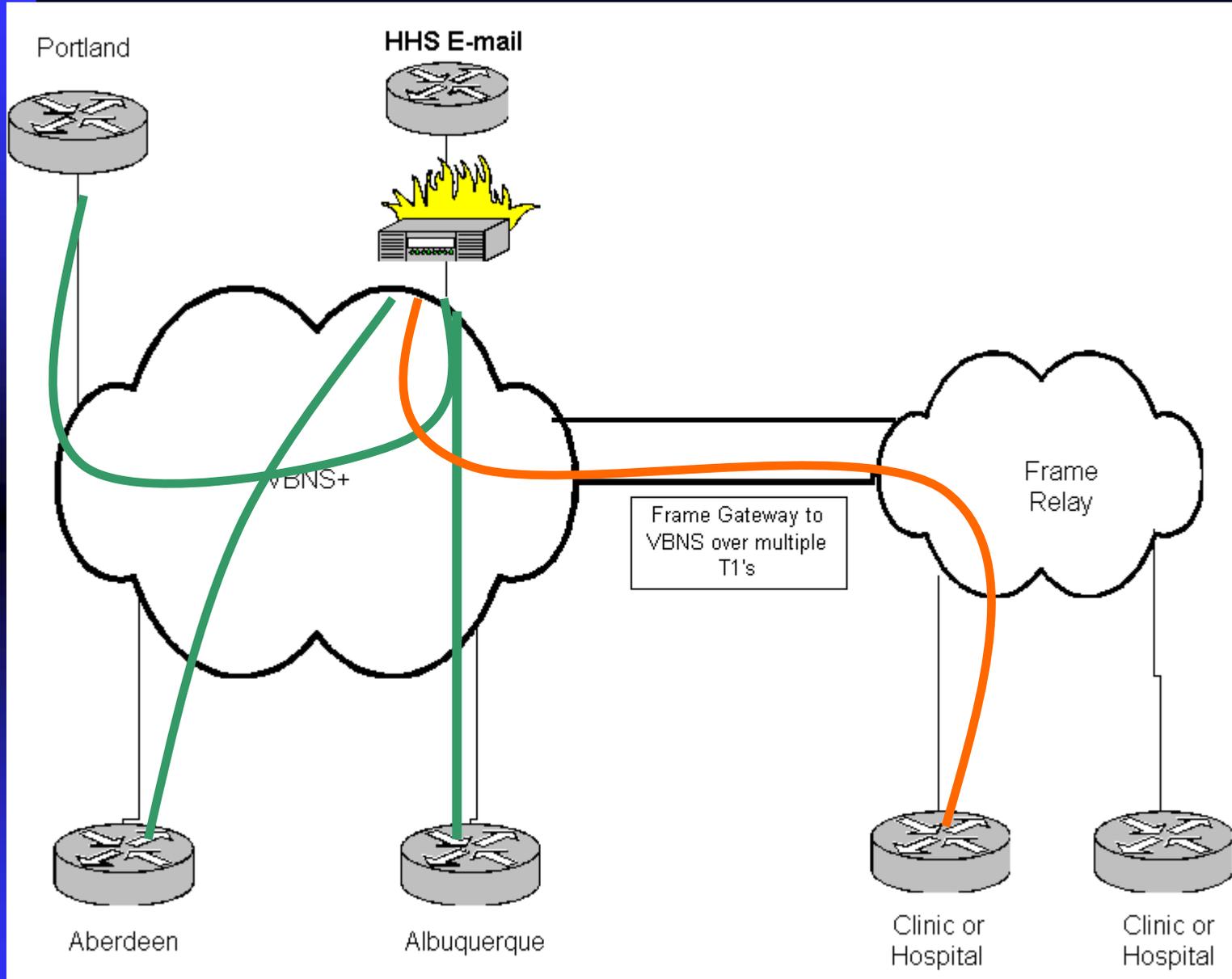
- MCI is providing new Telco access circuits at 45 IHS Sites.
- 34 Sites are complete ready to be scheduled for activation.
- 38 sites have local telco loops delivered.
- 41 sites currently have firm loop delivery dates from local telco.
- The remaining sites are scheduled to have telco loops delivered by 11/28/03.
- All sites with telco installs to be completed end of November.
- Gateway orders to support the indirect access Frame Relay Service Remote sites (sub 768 KBPS) are *Complete*.

IHS Migration Strategy and Cut-over Schedule

- Activation's are divided into 2 activity types: Direct (HQ's, Area Offices, Remotes Sites above 768Kb/s and Indirect (RS's with Speeds less than 768KBPS)
- Direct: Requiring physical cut-over to new telco access loops and enabling of new routing tables at both customer and MCI routers and subsequent testing.
- Indirect: Requiring logical cut-over to 2 new PVCs (Primary and Backup) and subsequent testing to include backup and recovery verification of the redundant PVC. *(Gateway circuits to be activated prior to start of Indirect cut-overs)
- Actual schedule for specific site activation strategy TBD.

Looking Forward

- Scheduled Weekly Conference Calls(Day and Time TBD)
- Activities to include Weekly Conference Calls, Local Loop Delivery, Inside Wiring to include all associated LCON's, Router Configurations and Site Turn-up
- MCI Points of Contact



Summary HHS-Net Benefits

- Flexible routing enables applications
 - ◆ Fewer hops to enterprise applications
 - ◆ Fewer hops between Areas
- 24 x 7 monitoring by HHS ITSC and MCI
- Fault tolerance – re-routing within VBNS
- Impact of a single line failure is reduced
- Potential reduction in IHS network management costs