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Our New Community Broadband Awards Program

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NCRnet: How the National Capital Region is Building a 21st Century Regional Public Safety Communications Network

By Chris Willey and Ziggy Rivkin-Fish

In the post-9/11 world, all the local jurisdictions in the National Capital Area (NCR) have come together to deploy a region-wide public safety communications network.

NATOA chose to recognize this network with the 2007 Community Broadband Network of the Year Award.

The network, known as NCRnet, is the collaborative work of 21 jurisdictions in three states in and around Washington, D.C. The NCR Interoperability Program (NCRIP) is intended to establish digital networks and systems interoperability for public safety and emergency response. Through NCRIP, the region applied for funding from the Federal Department of Homeland Security (DHS) to use fiber optics to enhance public safety and promote emergency communications.

NCRnet's Goal Is Public Safety Interoperability

The goal of NCRnet is to create a government-controlled fiber optic

network that local government agencies and organizations can use to share critical data and information during emergencies and during day-to-day operations. NCRnet will interconnect public safety databases, communications, and functions in order to manage regional incidents and emergencies. As part of an effort to build and improve interoperability of Emergency Support Functions (ESFs) in the region, NCRnet will connect the existing NCR jurisdictional networks (many of them Institutional Networks or "I-Nets") to form a secure and reliable cross-jurisdictional institutional network and minimize dependence on carrier and service provider networks.

The Network Was Planned for Security, Reliability, and High Bandwidth

In 2005, NCRIP assigned a team (known as the “I-Nets Team”) to assess requirements for the network and to pilot an initial interconnection between the District of Columbia and Montgomery County, MD. The needs assessment demonstrated conclusively that local first responders and emergency support personnel need a secure, reliable, regional communications infrastructure; in particular, regional video streaming and videoconferencing, applications that can best be supported over fiber optics.

The I-Nets team established a number of design principles in consultation with stakeholders and on the basis of the needs assessment results. Among these:

- The ability to support a diverse community of potential users (first responders, public health, local, state, federal government, education) without conflict between the users.
- A robust, scalable, survivable network infrastructure that connects with each participant’s own fiber network.
- The need to operate independently of leased carrier infrastructure, the Internet, the public switched telephone network, and the I-Net electronics of individual jurisdictions.
- A platform for real-time interoperable data exchange between different users regardless of native applications and formats.

These design principles ensured not only that the developing network fulfilled regional needs, but that this would be achieved in a cost-effective manner.

The Network Was Built Using Local I-Nets

Local government I-Nets and Franchise agreements are enormously valuable resources in designing a cost-effective, inter-jurisdictional,



fiber-optic network. The Franchise agreements typically define acceptable use in a manner consistent with public safety usage.

I-Nets are well suited to public safety communications. Their independence from commercial carrier lines assures a survivable network when commercial options are saturated. In addition, local government control allows flexible network design, and end-to-end risk and security management.

I-Nets also serve as a strong base for NCRnet due to spare fibers in existing I-Net plants and provisions for rack space at potential hub sites, which allow NCRnet to re-use existing assets. In addition, the NCR jurisdictions’ franchise agreements typically have provisions for building out and extending I-Net footprint at advantageous cost – often to the mutual benefit of government and cable providers.

The Network Was Designed for Flexibility and Local Control

NCRnet was designed for maximum flexibility to reduce the need for future redesign or complicated network governance. The current implementation treats NCRnet as a “semi-trusted cloud” – something like a private internet. Jurisdictions protect themselves with a firewall and manage communications into their own networks with an extranet router. On the NCRnet side of the demarcation sits an Edge Router that handles traffic within the NCRnet cloud. NCRnet

monitors only the equipment on its side of the “demarc,” while the jurisdictions are responsible for the equipment that controls access within their own networks.

This design provides scalability as application needs expand; allows maximum jurisdictional control and risk management; and ensures the integrity of NCRnet, further simplifying governance.

What Has Been Achieved?

After only two years of effort, NCRnet already connects the District of Columbia, Montgomery County, MD, Prince George’s County, MD, Rockville, MD, Fairfax County, VA, the City of Fairfax, VA, Falls Church, VA, Prince William County, VA, and the Metropolitan Washington Council of Governments (MWCOC). Assuming anticipated funding, all the remaining jurisdictions in the region will be connected within two years.

Of course, a network is only as good as the applications that provide benefits to the end-users. The needs assessment demonstrated the need for routine (as well as emergency) use to ensure effective interoperability in the event of emergency. Indeed, day-to-day use allows users to learn systems and applications and allows planners to spot issues and resolve problems in non-critical times.

With that in mind, the region has already developed one key application for NCRnet: a regional Emergency Management video conferencing system. This program interconnects Emergency Operations Centers (EOCs) in 19 jurisdictions and provides a secure, robust solution independent of commercial networks.

Planned Applications Enable Routine & Emergency Communications

Current plans call for adding the following applications:

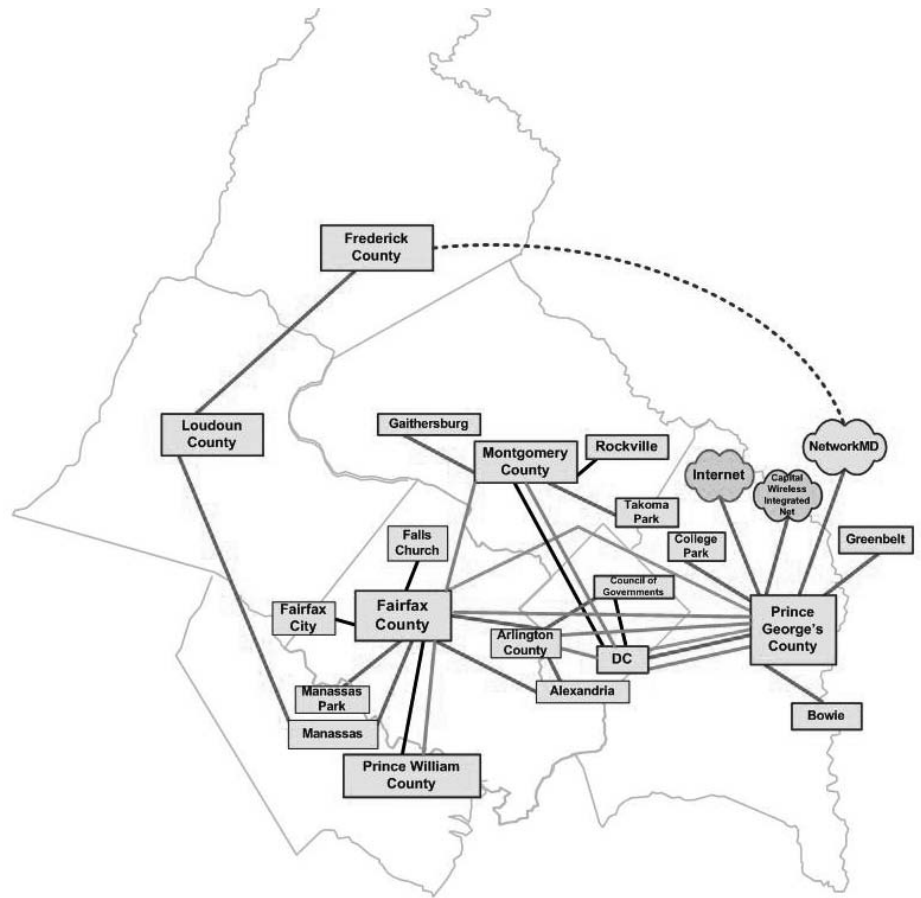
- **Web-based incident management and alerting system:** Delivers customizable messaging boards to emergency

managers and first responders with alerts, reports, graphics, and maps.

- **Data Exchange Hub (DEH):** Facilitates the rapid exchange of key emergency resource data using an Enterprise Service Bus. DEH will list defined data elements from contributing data owners and push them to authorized users and applications. A key focus of the DEH is CAD-to-CAD interoperability.
- **Regional Automated Fingerprinting Identification System:** Enables NCR law enforcement officials to share fingerprints and mug shots.
- **Geographic Information Systems:** Maps and tracks geospatial data. Map elements are stored in a variety of formats with different degrees of security attached to different layers.
- **Computer Aided Dispatching:** Facilitates dispatch and response for first responders. CAD is integrated with GIS to exchange information on resources and assets, personnel, calls for service, hospital status/availability, transportation resources, and alert notification.
- **Voice Hotline:** Interconnects emergency managers and first responders independently of the public switched telephone network for emergency coordination and routine conferences.
- **Training:** Facilitates secure joint training across jurisdictions without travel or use of public network resources.
- **IT Backup and Recovery:** Enables jurisdictions to mirror, save, and restore IT resources at facilities outside the jurisdictions.
- **General Government and Education Applications**
- **Transportation data:** Shares full-motion, high-quality traffic camera feeds and intelligent transportation system resources regionally.

What Has This Project Demonstrated?

NCRnet demonstrates the utility of



using existing governmental and intergovernmental assets at the physical as well as institutional level. The cable franchise agreements have proved a powerful tool to meet critical public needs in ways that would be either too expensive or inflexible if approached by other means.

Perhaps most importantly, NCRnet helps meet government's need for high-bandwidth networks; not only to support current applications, but also to support the applications of the future. These networks can help us prevent the kinds of emergencies we've witnessed and prepare us for those we haven't yet experienced. ■

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