



# IPv6 Business Applications



# IPv6 Delivers Business and Operational Value by Enabling a Broad Range of Innovation



Moore's Law states that computing performance, when measured by chip capacity, doubles every 2 years. Information proliferates exponentially, and technology continues to keep up—at least currently. But with some 54.1 million laptops predicted to ship in 2011 in the United States alone, and sites like Facebook having more than 500 million registered users, with the number of text messages daily exceeding the population of the planet, and with the explosion of Internet-capable devices today—things like smartphones, sensors, vehicles, Global Positioning System (GPS) devices, personal appliances, etc.—it is time to prepare for the future because the future is here.

IPv6 technology can provide many advantages for public agencies, including improved routing capabilities and enhanced mobility features for wireless use. IPv6 can give civilian agencies the capability to significantly improve their operations and services. The protocol can also enable the military to carry out its vision of network-centric operations. Imagine a technology that gives government the ability to assist its citizens quickly, easily, and confidently. That technology is available today.

IPv6 expands the number of available IP addresses, making it possible to establish peer-to-peer communication among an unlimited number of devices. Agencies can set up a network of peer-to-peer, self-configuring IP devices that afford instant cross-functional access to real-time facts, data, and converged communications applications. This newfound flexibility allows employees to bring information to the point of need—making immediate, organized responses a reality in everyday and emergency circumstances alike.

In peacetime, IPv6 can help government agencies reduce expenses, speed response time in disasters, promote safer and more environmentally sound living, and aid in humanitarian efforts. In wartime, IPv6 can connect soldiers, weapons, vehicles, computers, communications systems, and platforms through a wide array of wired and wireless links, enabling them to share information quickly. Battlefield and environmental sensors can facilitate timely resupply efforts and improved tactical planning.

**“IPv6 enables the net-centric battlefield of the future.”**

– Thomas McCrickard, III, Chief of the U.S. Department of Defense IPv6 Transition Office

**“It is when we open our minds to the impossible that the possible can exist.”**

– Tom Myers, “The New World Media Using IPv6,” 6Sense White Paper



The following are some of the applications available using IPv6 technology that could serve the U.S. government.

## IPv6 Helps to Provide Consistent, Coordinated Services to Citizens

Using a central device to communicate alerts, such as AMBER alerts or Public Safety Announcements, to the public during an emergency can mean quicker response time. With IPv6 technology, first responders and emergency personnel can use a single device that offers tactical communications, including mobile computing, to assist in rescue operations when disaster strikes.

When most emergencies occur, there is little or no warning—no time to prepare. IPv6 can enable responders to set up highly secure mobile or video conferencing temporarily, enabling employees from different agencies and organizations to communicate. Compare that to a hastily formed group trying to coordinate emergency response plans while using different networks. With IPv6 technology, disparate networks can be joined as one. The various federal and local agencies on the scene can collaborate and coordinate a response with a more confident voice to the public.

## IPv6 Enables Efficient, Synchronized Building Search and Rescue

With IPv6, first responders arriving on the scene of a disaster or emergency can access vital information that can help them reduce or eliminate casualties. Building blueprints, records of hazardous or sensitive materials, and building inventories can be sent to handheld devices to assist responders in rescue and situation assessment. A central messaging system can also advise responders and other personnel on the scene of approaching bad weather or changing conditions that could compound the situation.

In emergency situations, businesses have to evacuate employees quickly and save critical data. IPv6 can work to save both lives and data. Facilities personnel using a handheld device can be armed with the knowledge of what to try to save or salvage—and where it is located. With the same devices, rescuers get an immediate employee count and know where they are in the building to aid in the evacuation or rescue.

## IPv6 Can Make Buildings Smarter and Safer

IPv6 allows facilities to connect all sensors on one network and allow for applications such as automated climate controls. Automated climate controls can help government agencies reduce operating costs by becoming more “green.” Utility sensors, monitored from a data center location, can adjust heating and cooling systems in real time, decreasing the use of power and the associated cost. To improve indoor air quality, centralized controls can monitor heating, ventilation, and air-conditioning systems and automatically schedule routine cleanings based on tagged data.

IPv6 also enhances the capabilities of video and sensor surveillance. Building surveillance can be made state-of-the-art. Visual and audio surveillance monitors can identify individuals and send alerts if necessary. Sensors can detect concealed weapons, and send automatic alerts when something or someone suspect enters a building. Using a device that monitors vital or electronic statistics, security and emergency personnel can remotely track individuals or objects to identify their location in a building.

If a hazardous event occurs, sensors can indicate—within a certain range—which harmful substances are in the air and adjust the ventilation systems to prevent or reduce the contamination. Sensors can also send an alert that sets emergency plans in motion. Handheld devices can remotely map the interior of a building to show the specifications of the building for rescue and recovery.

## Citizens and the Environment Benefit from Implementing IPv6

By centrally tracking environmental data, federal agencies can reduce global warming, determine green choices, and monitor pollution levels. Using sensors, agencies can measure the amount of waste collected and dumped and send that information to various sources that monitor possible health concerns, potential risks, and environmental effects.

With IPv6, Intelligent Transportation Systems can provide two-way, real-time communications along the roadside. Authorities can use this data to help with problems such as road rage and pollution, and even use roadside sensors to help protect citizens. Road-rage statistics can be monitored by detecting horn blowing with filtered noise sensors that transmit the data for analysis. The Department of Transportation receives decibel readings and pollution statistics from multiple sensor locations to determine the effect on citizens’ health and the environment. Sensors attached to vehicles can track the emissions from personal automobiles versus those from public transportation and then transmit that data to a central location for analysis and planning.

Solar-powered devices can receive information about weather conditions to help farmers avoid dangerous conditions that could affect crops or livestock. Sensors and monitoring systems can track rainfall, insects, and disease-affecting crops. The same systems can transmit data that shows crop damage or concerns about livestock to all those affected, including the U.S. Department of Agriculture. This data can also be used to help in budgeting for farm aid and other financial assistance. Farm animals can be monitored with electronic tracking tags to determine age, location, illness, and death.



## IPv6 Provides Instant Access for Greater Public Safety

IPv6 technology allows instant cross-functional access to first responders and the public. Emergency personnel can use handheld devices with voice, visual, audio, and other data. During a disaster such as 9/11, they can establish a temporary central command center to communicate with the Department of Homeland Security, the National Guard, Air Combat Command, and other U.S. agencies using wireless communications.

Government agencies can use a national alert system to warn citizens of natural or man-made threats. When an emergency strikes, IPv6 technology can enable hospitals and rescue personnel to establish mobile medical stations. Hospitals can be equipped with the capability to track patients' illnesses, duration of stay, and discharge times. Those statistics can be used to determine emergency capabilities and response needs.

## With Centralized IPv6 Systems, Employees Never Have to Be Out of Touch

In times of emergency, overseas employees can access data and respond immediately by using IPv6-enabled devices. The Trust for American Health projected that in a pandemic, the United States could suffer losses of \$68 billion, or roughly 0.47 percent of our annual gross domestic product. During a pandemic, employees can use wireless communications to work transparently from their homes, reducing their exposure to the disease and helping prevent its spread. They can even perform remote medical testing of areas suspected of exposure. With IPv6 technology, the economic and physical health effect of a pandemic could be minimized while work continues.

## Business Mergers and Acquisitions Are Easy with IPv6

Picture a smooth merger or acquisition needing few system changes or enhancements. IPv6 eliminates IP memory limitations and the need for server-based address management. The removal of Network Address Translation (NAT) and Port Address Translation (PAT) also allows for easy access by service and repair companies to monitor and maintain gear without coming on site or co-locating on site. This benefit can save a substantial amount of money. Mergers and acquisitions can be complex and can force companies to leave existing IPv4 address space in place and not have full integration. When server-to-server or client-to-server service is needed, then single-double static NAT translations are often required. IPv6 can be deployed to enable service access per site and per application.

## Maintain Transportation Vehicle Safety and Inventory with IPv6

In 2009, the U.S. government had an inventory of 651,703 vehicles worldwide. Those vehicles traveled more than 5 billion miles. By monitoring or tracking those vehicles worldwide through the use of IPv6-enabled sensors, government agencies can better recover lost or stolen vehicles. IPv6-enabled vehicle monitoring can also help the government improve vehicle safety, reduce maintenance costs, increase Federal Emergency Management Agency (FEMA) preparedness, monitor inventory control, perform remote queries, and plan vehicle budgets. By using inventory control tags, agencies can determine which vehicles will age and need replacement.

Centralized vehicle records can indicate which vehicles need routine maintenance checks by using internal sensors that transmit data to a common location. The system then makes automatic appointments and sends that information to the driver, who accepts or changes the appointment (decreasing the time spent by personnel in scheduling maintenance). Sensors can also alert the driver to low tire pressure or other vehicle problems. Sensors or transmitters can alert drivers, train conductors, pilots, and ship captains of hazardous conditions. Simultaneous transmissions can be sent to the Environmental Protection Agency (EPA) and emergency personnel when a disaster strikes.

During an emergency, agencies can also use RF identification (RFID) to track and monitor vehicles and critical supplies. Items can be tagged and monitored from a central location, enabling personnel to make quick adjustments for those in need. Using RFID, supplies can be tagged, uploaded to a central inventory system, and automatically reordered when they run out or reach a specified minimum. The large number of IPv6 addresses provides the capability to assign unique addresses to each individual supply item.

## Cisco Makes Transitioning to IPv6 Simple and Secure

Now that you have glimpsed the IPv6-enabled future, let Cisco help you get there.

Cisco offers a wide range of IPv6 implementation capabilities to address short-term requirements while also supporting a more gradual, long-term approach incorporating best practices and knowledge derived from previous customer deployments. To design a migration roadmap best suited to your specific needs while mitigating transition, cost, security, and training concerns, Cisco provides assessment services that use a collection-and-reporting tool. The following items help us determine the most beneficial IPv6 deployment route for you:

- **Report:** A customized, color-coded survey that identifies the IPv6 capability status of your network
- **Scorecard:** A confidential, high-level evaluation of the IPv6 capability of devices on the network; also color-coded
- **IPv6 capability assessment:** A thorough analysis that compares your agency's network devices against the IPv6 business rules

After the report is compiled, Cisco creates a customized scorecard, assessment, and audit based on your IPv6 readiness, and then works with you to establish a migratory path aligned with your strategic business objectives.

## Make Your Move

For detailed technical guides about how to plan or deploy IPv6 in your agency's network, refer to the Cisco® "Deploying IPv6 in Campus Networks" and "Deploying IPv6 in Branch Networks" white papers found here: [www.cisco.com/web/strategy/government/usfed\\_ipv6.html](http://www.cisco.com/web/strategy/government/usfed_ipv6.html).

To find out more about IPv6 or the Cisco network readiness assessment, call your local Cisco representative today or visit [www.cisco.com/go/ipv6](http://www.cisco.com/go/ipv6).



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