Case study

Lights, camera... privacy?
How DC’s smart city initiatives don’t sacrifice privacy for safety.

The last thing you might think of when the streetlights are on and the cameras are recording is privacy, but that’s exactly what the Office of the CTO (OCTO) in the District of Columbia intended when it rolled out its smart city pilot on “America’s Main Street.” Here we’ll take an in-depth look at the DC deployment, lessons learned, overall benefits, and DC’s plans for expanding its smart city initiatives while holding as primary their credo of privacy.

In 2016, DC launched Pennsylvania Avenue 2040 (PA2040), a smart city pilot initiative with the goal of enhancing citizen experience in the nation’s capital. Using IoT technology and Verizon solutions, DC deployed both Intelligent Lighting and Intelligent Video along a 3x3 block area of Pennsylvania Avenue west of the White House, where they had just installed a ubiquitous gigabit public Wi-Fi network. The city installed 76 intelligent core node LED luminaires—73 of which are Wi-Fi and 3 of which are cellular—and 20 intelligent video nodes. Energy savings from the LEDs were immediate. Replacing traditional high pressure sodium (HPS) lamps with energy-efficient LED luminaires in and of itself reduces energy costs by as much as 50-70%. But the benefit of an intelligent lighting solution provides a lot more than just energy savings.

Prior to installing the intelligent lighting solution, when a light malfunctioned the city had to wait for a 311 call to inform them of a failure, which required an average of 24-72 hours before a fix could be implemented. With an intelligent lighting solution in place, remote monitoring can detect an impending malfunction, allowing for repair before a failure, and usually in under 24 hours before a 311 call. In the PA2040 pilot, 76 HPS street lamps were replaced with LED smart node luminaires along Pennsylvania Avenue. There are roughly 75,000 HPS lamps in all of DC; the plan is to replace all of them with LED smart node luminaires, which could reduce energy costs by up to 80%. That’s some serious city savings, just for lights. In orders of millions of dollars per year.

Not only can remote monitoring and dynamic scheduling decrease energy and maintenance costs, things like proximity sensors and special events scheduling—where lights turn on or up at the detection of movement or for the duration of a specific event—can provide increased feelings of security and crime deterrence. In fact, evaluating how various lighting solutions would work for different types of neighborhoods was one of the reasons for PA2040 in the first place.

Piloting new solutions
“The city wanted to build a proof of concept and start creating an environment where we could deploy multiple smart city solutions and see how they behaved individually and see how they act in concert,” says OCTO’s Program Manager, Troy Icenhour. OCTO chose a high-commuter area to act as a virtual showcase for the rest of DC in order to study how those solutions would resonate when applied to residential neighborhoods and lifestyles, a component that’s most important to the District.

DC also installed 20 intelligent video nodes for the PA2040 pilot for parking management solutions. When 30% of traffic congestion in urban areas can be attributed to drivers looking for parking, the ability to quickly and accurately find a parking space can not only reduce traffic congestion, but can also reduce fuel emissions spent searching the blocks for open spots. DC’s pilot includes a trial whereby a smartphone-based application, such as Mapquest, can display a map of open parking spots on a block-by-block basis in near real-time, a solution that works in both rural and urban locales, with obvious benefits in commuter-heavy areas.
In addition to parking solutions, the video nodes were also able to capture traffic and jaywalking counts at specific intersections, which led to a decision by DC to implement Verizon’s Intersection Safety Analytics solution (ISA) in their next phase of PA2040. ISA provides 24x7 data and analytics that give insights into how cities and transportation leaders can improve the safety of citizens sharing intersections. As accurate analytics are critical to providing safer intersections and infrastructure planning, having better compute technology allows for a more robust overall solution. As such, DC has recently added 4K video nodes (VN4K) along the PA2040 footprint, which provides the extra compute power for better analytics.

Privacy as primary

In a town where security and protection are critical, it is important to note that individual privacy is just as important as national security. Maintaining the privacy of residents and visitors is exactly what DC had in mind when deciding to deploy VN4Ks for Phase II of PA2040, because the focus is not on who contributes toward traffic on the streets as much as what that traffic means to citizens. In short, it’s about the metadata.

Metadata—in the context of IoT—focuses only on the analytics of objects in motion: how many humans jaywalked, how many cars ran red lights, how many big rigs drove down the street during the week, how many bicycles rode through an intersection on a Saturday. A metadata application, such as Verizon’s edge-based ISA, is specifically designed to anonymize, rather than personalize data. Whether the jaywalkers were men or women, or the cars were out of state or local is not the main goal. The purpose of metadata is to effectively count without watching.

Core values

As the OCTO team continues to roll out additional smart city solutions, their fundamental goals remain consistent.

First, enhance the lives of citizens, not just on Pennsylvania Avenue, but everywhere in DC. “In reality, most people want to know not just what the immediate outcomes [of smart city solutions are],” begins Mike Rupert, OCTO Communications Director, “but what the long term, positive impact of these tools are... yes, it’s really cool that there’s sensors here, but what can they do? Can they reduce congestion, can they potentially save lives?”

Second, “Citizen privacy is one of our deepest core values,” begins Icenhour, “and if it’s a choice between having all the capability in the world and citizen privacy, we’re going to choose citizen privacy every time.”

And finally, partner with a company who is committed to a city’s goals, not just to their own cool tech. “We really appreciate that Verizon is taking the time to understand what’s important to the city, beyond the technology itself,” says Icenhour.

Aw shucks, OCTO, we like you, too. And we’re excited to see what great things you’ll do next.

Solution overviews

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