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Moderator: Elaine Sloan
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Coordinator: Welcome and thank you for standing by. Parties are in a listen-only mode for the duration of today's call. Today's call is being recorded. If you have any objections you may disconnect at this time. Now I will turn the meeting over to Ms. Katherine Bates. Ma'am, you may begin.

Katherine Bates: Good afternoon everyone. Thank you for joining us today for BroadbandUSA's monthly webinar on broadband topics of interest, policy and decision makers, practitioners and consumers.

I'm Katherine Bates and I'm the Manager of State Partnerships for BroadbandUSA and I'm excited to introduce today's webinar. Before I hand it over to our moderator, I first want to view some logistics with you.

We will open the webinar up for questions after the completion of all the presentations. Please use the question box on the right hand side of the screen to submit any questions or comments you may have.

Second, the presentations, along with the transcript and recording of today's session will be available on the BroadbandUSA Web site within seven days of this webinar under the Events tab.

We have a new BroadbandUSA Web site that provides you with information about our technical systems program, guides, products, and publications and other tools that can assist you with the planning, funding, and implementation of your broadband project.

Our new Web address is www.BroadbandUSA.ntia.doc.gov, and again, the presentation transcript and recording of today's session will be available on there within seven days from today.

I'd now like to hand over our webinar to David Forscey who's a policy analyst with Homeland Security and Public Safety Division at the National Governor's Association. He has graciously agreed to moderate our webinar for us today. David?

David Forscey: Thank you very much. Hello everyone and thank you for joining, and thanks so much to NTIA for putting this together. So as we all know broadband is indispensable to a range of new technologies and services that cities and states are deploying to make life better for citizens and enhance government accountability.

So these smart communities as we like to call them and many like to call them offer opportunities to transform how citizens, businesses, and governments interact.

So I'm going to make a shameless quick plug and point out that this potential cannot be achieved under existing conditions. Many current efforts are

fragmented. They're often limited in scope and they don't always take full advantage of the entire suite of policy levers that are available to state and local governments.

So at the National Governors Association in our Center for Best Practices where I work, we are launching a smarter states, smarter community's initiative to advance a smart for all vision. We want to help Governors develop statewide programs that build upon and expand many of the local and existing state successes just like the ones we are about to learn more about.

The initiative will start with a 3-year, 3-phase effort to educate, accelerate, and replicate smart efforts across the country. We will initially focus on opportunities in energy, transportation, and public safety and emergency response where states are already making strides.

If you want to know more, please reach out to Katherine after the webinar and she can put you in contact with our team, which brings us to our main event where the focus is how smart states are using innovative techniques to enhance technology use.

So we have four very impressive representatives who are going to share how states are moving the ball forward on using Broadband and other technologies to change healthcare delivery, enhance governance, improve disaster mitigation, control traffic and lighting, and generally grow the economy.

So please allow me to introduce our four guests, David Ihrie who's the Chief Technology Officer for the Virginia Center for Innovative Technology, Mahesh Nattanmai, Chief Digital Health Strategist for the New York State Department of Health, Lisa Ullman, the Director for the Center for Healthcare Policy and Resource Development at the New York State Department of

Health, and Essam El-Beik, Consultant at the Illinois Century Network in the Illinois Department of Innovation and Technology.

I just want to note that we will have time for questions at the end of the presentations so first we'll turn to David Ihrie who as the Chief Technology Officer at CIT, a state chartered not-for-profit, lead the portion of the economic activity for the Commonwealth of Virginia.

He has over 35 years industry experience as a direct innovator in the fields of satellite and terrestrial communication and he's been a principal in seven startup company industries ranging from nuclear power to digital broadcast to analytic software for the intelligence community.

So with that, please welcome David and I turn it over to you.

David Ihrie: Thank you David, and appreciate the opportunity to talk about what we're doing in Virginia with smart communities and with broadband. So if you can go to the next slide, first of all as you mentioned, CIT is a not-for-profit organization. We support missions for the Commonwealth of Virginia around innovation, commercialization, and entrepreneurship and the expansion of broadband throughout the Commonwealth.

And we do that through a number of initiatives including a number of direct investment programs, several different business accelerators focused on areas from public safety to cybersecurity to the built infrastructure.

And then leading further on behalf of the Commonwealth, our work with NIST the Global City's team challenge, Smart Cities Council, as well as internal to the state the Virginia Smart Communities Working Group, which is

producing a set of policy recommendations and an implementation roadmap for the Commonwealth.

So if you'd move to the next slide, as you can see as we started working this, there are a number of different projects that are already well underway around Virginia, a lot of this activity has been going on and sort of unique efforts from various state agencies, from our university programs, and various individual communities.

In fact, today I'm participating in this webinar from the University of Virginia where we're conducting a workshop on how to bring technologies to close the rural-urban divide.

So part of our activity has been other ways that we can number one, provide a unifying vision around this set of disparate activities and secondly, what can we do at the state level to really enhance what individual communities, individual agencies are already doing on their own.

So if you go to the next chart you can see that as we came into this we have a number of the same challenges and opportunities that people see everywhere when they do this, so the fundamental government focuses on how we can improve government services, what can we do to improve the efficiencies, enhance the delivery of services that we're providing.

I think there's a second very important challenge that has recently been top of mind for a lot of people because of activities at the national level, data sharing and governance, and certainly Atlanta's experience with the recent ransomware attack and Facebook's testimony on the hill around privacy and so forth have really brought those issues of privacy and cybersecurity to the

forefront and we believe those are fundamental to any kind of implementation going forward.

There are a number of other questions around data governance including ownership and liability and how you mix data from various sources, public data, private data, data that may be protected under HIPAA, healthcare laws or, you know, educational or other laws.

Certainly now with the European GDPR coming into effect, how does that come into the picture.

And I think the third major challenge that we face is the digital divide here and how do we make sure that these benefits that come from this set of technologies are accessible to every citizen in the Commonwealth.

I like to use the picture there as a reminder. In the foreground is Dulles Airport and because this area's the number one home for data centers in the world. Actually about 2/3 of the world internet traffic goes through this picture.

But if you look at the horizon and the range of mountains there, they're also areas where there's very limited broadband access at all. In some cases no access at all. I'm sure New York State has done a fantastic job. You'll hear from them later on their program. We're looking to see what we can do to expand that coverage both in broadband connectivity but also in the set of value added technologies and services that build on top of that.

So if you go to the next slide, we've -- as part of our working group activity -- we've made a set of policy recommendations for Virginia. And these are

currently being reviewed by the new administration. What can we do at the state level to lower the barriers to entry for communities?

And so particularly if we think of our smaller communities if they have to start from scratch in building a cyber-secure infrastructure, an infrastructure that protects privacy, an infrastructure that take advantage of the data assets that are available and the associated, you know, legal things that go with that, it's a very complicated problem and it's a very challenging activity for smaller communities to undertake.

So we hope to do things at the state level that can lower those barriers to entry and some of those might be, again, a unified solution, preapproved framework for sharing data and a governance for the state level. How do you bring on new data assets? How do you maintain the integrity of assets that are on there?

We've had some good support from the legislature already in terms of identifying the need for a Chief Data Officer for the Commonwealth and so we're hoping to move forward with that.

And then the second piece is leadership and implementation. Can we start some pilot programs? Can we show the way? Can we work with individual communities to prove out this combination of state assets and local initiatives, you know, in a way that will be a win for everybody.

The good news for us is we do have a great starting point. We've been working for a number of years with what we call the Broadband Path. It's a mechanism whereby CIT and our folks work in conjunction with other agencies of the state and with local communities to first of all identify their priorities, help them understand what resources are available, and help them

interact with the providers that are out there in industry and in the commercial world.

So we think that's a great mechanism to build on and to move forward as we expand that to look at broader issues of the smart communities. And so if you can move to the final chart here. And here's an illustration of what that Broadband Path looks like.

We're already helping a number of different underserved communities get connected to broadband capabilities.

And so in summary, I think our approach is fairly straightforward. When we talk to community first, get connected. That's sort of a fundamental capability that supports the rest.

Then think about what the local goals are. What does the community need that varies widely from our more densely populated urban areas to our more rural and agricultural areas?

And then finally what can we do to help leverage state resources and private resources to help make those goals a reality. So that's a quick overview of what the Commonwealth of Virginia is doing and CIT's role in supporting that for smart. Thank you.

David Forscey: Okay, thank you David. And as a reminder, we will have time for questions at the end of the session. I know I have many. Please use the question box on the right hand side of your screen if you'd like to submit any questions or comments.

So with that we'll turn to our next speakers who are Mahesh Nattanmai and Lisa Ullman. Mahesh is the New York State Department of Health's Chief Digital Health Strategist. As a member of the executive leadership team, Mr. Nattanmai is defining the Health Department's digital vision and strategy and serving as a driving force behind the adoption of new technologies to better serve consumers and providers throughout the state. Prior to this he was New York State's Executive Deputy CIO.

Lisa Ullman joined the New York State Department of Health as a Director for the Center for Healthcare Policy and Resource Development in the Office of Primary Care and Health Systems Management in 2013.

Previously, beginning 2007, Ms. Ullman served as Assistant Counsel to the Governor, providing legal advice on healthcare issues. So please welcome Mahesh and Lisa.

Mahesh Nattanmai: Thank you David. Good afternoon. I'm Mahesh Nattanmai. I'm going to speak a little bit about how Telehealth as a technology plays a role in enhancing care especially in rural areas. So next slide please.

So we're going to touch on these four broad areas. One, what is telehealth? I'll give a very brief introduction of what Telehealth as a technology means. And then what's driving the demand. Is it just a buzz word or is it really something that's happening and people are adopting?

And, you know, what are the kind of barriers that we have heard from both the providers and also the patients who are trying to use Telehealth as a modality of getting, you know, care.

And then the last one which I'll turn it over to Lisa. Lisa's going to really talk a lot about the steps that the New York State is taking to improve the adoption of Telehealth both from our regulatory side and also what we have done on the broadband side. Next slide, please.

So what is Telehealth? At a very high level, it is a collection of means or matters for enhancing healthcare, public health, and health education delivery and support. Right? Now, it's a lot of words.

End of the day, what it means is if, you know, it's either education or it's a direct patient care or it's a you know, remote patient care, anything that is done to really provide healthcare to a patient. And also sometimes it also refers to provider to provider communication.

So all that encompasses this broad term called Telehealth that is another word that's used usually, you know, interchangeably which is Telemedicine. Telemedicine is a term that was originally introduced for really synchronous, you know, face-to-face or synchronous connection with the provider and a patient. So, next slide please.

So what's driving the demand? Now, is it a buzz word or is it really something real? Well it's - the demand is driven by this factor called value-based care. And as many of us, you know, are seeing it and reading it in the news, that healthcare here in US we spend a lot of money from a per capita basis but then the quality of the care, we may not be at the level that other countries are.

So going, you know, trying to make progress on that, one of the things that both state governments and the national level what's happening is moving

toward this thing called value-based care instead of what otherwise is called fee for service.

So you go to a doctor, you actually pay for every time you visit and the doctor gets paid. The value-based care is a more of a, you know, sort of a cap model so to say in lack of a better term, wherein you're paying pain for a population or you're paying for a group of patients and then you're really making the providers share the risk and the responsibility to make sure that the patient is healthy and also limit the costs and stay within those costs. And overall improve the quality of the care that the patient is receiving.

So that's at a very high level that kind of what is value-based care. Next slide please.

So that's the first factor, value-based care. Second is what we want to call is provider maldistribution. What does this mean? This is essentially a provider to patient ratio. If you're in an urban community probably you have access to a lot more options, healthcare options and choices and all of that but if you're living in rural all of a sudden all these options start disappearing and other factors such as travel and everything comes into play.

If you want to see a specialist, if you want to see your family care provider, you know, you're traveling a lot. So Telehealth is seen as one of the ways that you can cut down travel and also possibly have doctors who may not be in that region really provide care remotely.

So that's one of the reason why Telehealth is also becoming, you know, popular. Next slide please.

So the third one, that is this is more for millennial factor that is driving - it's just a consumerization. That's where everybody's you know, hooked to Facetime and Snapchat. It's the same sort of expectation that's coming to healthcare where they want the convenience, 24 by 7 convenience to reach the doctor and reach in different mean, using even text messages and other ways, looking at a mobile phone.

So those are some of the factors that are also driving what is sometimes referred to mobile health. That also fits into this whole broad category of Telehealth.

And then the high deductible is another one as insurance costs go up. One of the things that's happening as the deductibles are going high which means in some ways the patients are starting to pay out of their pocket because insurance is not covering up to a certain limit. Next slide please.

And this is - you know, just a same example of how the industry is changing. Your primary care, what used to be a brick and mortar, you go and visit a doctor at a physical address, is now becoming more of a virtual. It could be Telemedicine, it could be Urgent Care, Retail Clinics, or these are some of the trends that are starting to happen which is actually making room for all these new technologies to come in. Next slide please.

All right. So now we talked about why this is attractive. But also there are a lot of barriers. As this is at the very early stages these are some of the things that many state governments from a Medicaid policy and other things but also commercial providers are starting to see. First to, you know, reimbursement - how you get paid. How do you make sure that the care actually was given and it's not like falsified?

And then number two is licensure and regulations. There are different regulations when you especially cross state boundaries and all that stuff.

Broadband is a big area. Now Lisa's going to talk about it. And technology is very primitive which means a lot of technologies are popping up, a lot of different tools and software are coming up, but they may not be able to talk to each other, right?

So that's another technology barrier. There's no standardization. Slowly the standardization's coming in. And developing a business case is very difficult because there is no, like, model that is developed and you can actually repeat it.

So - and the needs of every geography is different, needs of every sector or every type of care is different, so developing a sustainable business case is also very difficult for the providers.

Interoperability, you know, exchanging the data information about the patient across different, you know, providers and also trying to - getting a view of - 360-degree review of the provider, so you kind of hop between Telehealth provider and your primary care doctor. How do you make sure that the information travels so that you're not actually going through the same thing over and over.

Data privacy, like David talked about, that's definitely a big issue here with the HIPAA covered entities and all that. And then the patient engagement. Ultimately even if the technology is good, you know, how open are the patient that is really trying to engage using this Telehealth tool?

So these are some of the barriers and I'm going to turn it over to Lisa so that she can kind of provide us a background on what the New York State is doing in terms of trying to address some of these barriers. Lisa?

Lisa Ullman: Thank you Mahesh. So several years ago New York enacted a law requiring insurers and the Medicaid program to pay for services delivered by Telehealth if those same services would be covered if delivered in person. That was a big step but there were still some limitations in the law that presented challenges to the full adoption of Telehealth.

So last fall the Department of Health convened an advisory group of insurers and healthcare providers as well as consumers to help us identify what changes might be appropriate to help further facilitate the use of Telehealth.

Based on that feedback, the governor proposed several changes to our law which were just enacted as part of our final state budget. I'd like to highlight some of these changes for you because we think that they will lead to a significant expansion of the use of Telehealth in this state. And they provide a good example of the ways in which technology is helping improve the lives of our residents.

So in many cases a patient will be at a certain location such as a hospital, a clinic, a physician's office and the staff at that facility will initiate an audio-visual connection with a Telehealth provider. This could, for example, be a specialist at a faraway location. And that practitioner who's actually providing the service can see the patient, converse with the patient, and provide a diagnosis or check on the progress of treatment. And that's traditionally what we think of as Telemedicine.

So based on the feedback we heard from stakeholders, in addition to allowing that type of encounter, we've now expanded the law to permit the patient to be anywhere. So they could be at home, they could be at a friend's house, visiting family in another state, and they will be able to connect to a healthcare practitioner for a consultation from their home computer, tablet, or phone.

This is significant, for example, in medically underserved areas of the state such as rural areas. It will help these residents better connect to primary care practitioners where there aren't enough of them and to see specialists that could take hours to reach in person.

This capability will also be used by healthcare providers to connect patients to follow-up care after a discharge from a hospital stay, for example, which will allow them to check in with a practitioner without having to travel. This can help improve the patient's recovery and in some cases could help them avoid being re-admitted to the hospital.

So our law does clarify that there are a wide range of practitioners who can receive Medicaid reimbursement for serving as a healthcare provider. So this is physicians, nurse practitioners, social workers, occupational therapists, certified diabetes educators, a whole host of providers.

We do provide that to serve patients located in New York State, these practitioners must be licensed or otherwise authorized by the state to practice here.

Also the delivery of healthcare by Telehealth means is bound by all the same federal and state laws and regulations that govern face-to-face encounters - requirements related to privacy, confidentiality, patient consent, and the

requirement to document services that are provided. So remember the practitioner can be located anywhere but they still have to make sure that they are complying with all of these requirements.

And as is the case with services delivered in person, the practitioner still has to make sure that they're exercising his or her medical judgment and that they're only providing services by Telehealth if it is clinically appropriate to do so.

Now one of the changes we just made as part of the state budget will permit alcoholism and substance use disorder counselors to serve as Telehealth providers. This is so important because right now we are dealing with a heroin and opioid epidemic that affects communities throughout the state and in fact throughout the nation.

We've undertaken a variety of measures as part of a comprehensive approach to prevention treatment and recovery. Providing reimbursement for these counselors to provide services by Telehealth is another tool in its sight. So as an example, someone could end up at a hospital emergency room and receive treatment for an overdose.

The hospital staff will have the ability to connect them to a counselor by Telehealth right then and there and start the process of getting them into treatment.

Opening up access to these counselors by Telehealth also will make it easier for patients in their homes to stay connected to treatment and aid in their recovery.

Another example, we just expanded the law to permit early intervention providers to provide services by Telehealth. Early intervention in a program that makes services available to children under three who might not be making progress like other children because of a developmental delay or disability.

So the program provides for interventions that have to be provided in the child's natural setting, often the home, and this means the professionals that provide these services must spend time traveling to different locations where the children are located.

And there's a limited number of these professionals, particularly those that can serve children, for example, who are deaf or hearing impaired or for whom English is not their first language, and they're not equally disbursed throughout the state.

And because families need to be involved, appointments often have to be scheduled for weekends and evenings. We think that providing Medicaid reimbursement for such visits when provided by Telehealth will greatly help reduce these barriers, improving access and making sure these kids get these services.

We also recently in the budget verified the long remote patient monitoring. This is a different type of Telemedicine, different than the type of Telemedicine encounter we just described.

This involves the electronic transmission of data to the individual's provider for purposes of monitoring a specific chronic medical condition such as high blood pressure. This can allow the provider to follow up with the patient and help the patient learn better self-management.

One example is a home care agency that's focusing on helping families control their child's asthma. There's a sensor attached to the child's inhaler which delivers medicine, and the sensor can electronically report back to the provider whether the use of the inhaler is happening at expected levels. If not, it triggers a nurse at the office to follow up with the family.

The provider's already reporting seeing better medication adherence, less need to rely on a rescue inhaler, and lowering costs of care.

So I've really focused on healthcare services during this discussion, but I just want to highlight that we at the Department of Health are working with several other state agencies that also expect to see increased reliance on Telehealth in their areas.

So we work with the agency that licenses or entities that provide services to people with alcohol or substance use disorders. We worked with them on that counselor proposal. Another agency oversees entities that provide mental health services and another provides services to individuals with developmental disabilities.

We're all working together to make sure we implement these laws in accordion manner and will be issuing guidance that helps ensure providers and consumers understand the role of Telehealth in the provision and receipt of care. If you could just advance the slide for me?

So the delivery of services in a secure and reliable manner requires access to high speed internet services. Fortunately, Governor Cuomo made it a priority to expand broadband access to every corner of the state.

Beginning in 2015 the Governor put into motion an initiative involving three rounds of investment. By the end of this year 99.9% of New Yorkers will have access to broadband. With that effort on the verge of being completed and with the changes that we just enacted to our reimbursement statutes, our expectation is that we are on the verge of a significant expansion in the use of Telehealth in New York.

I think that concludes our presentation.

Mahesh Nattanmai: Thank you Lisa. David, back to you.

David Forscey: Thank you both. Our next speaker, Essam El-Beik, is a consultant with Illinois Department of Innovation and Technology and helps to expand broadband access throughout Illinois.

Essam also facilitates smart cities and is currently working on smart street lighting for Illinois municipalities. He helps Illinois Century Network, the state fiber network, provide high speed broadband to community anchor institutions, municipalities, and commercial service providers.

Everyone, please welcome Essam.

Essam El-Beik: Thank you David. So I'll be talking today about smart street lighting. I'll be - in my presentation I'll talk up four topic areas. First, what Illinois has done in this area, secondly I'll talk about what smart street lighting is and what the smart street lighting architecture is about.

Thirdly, I will talk about why smart street lighting is an excellent candidate for municipality to upgrade to a smart street lighting solution. And then

finally, why the smart street lighting architecture is a good foundation for smart city applications and services. Next slide please.

So in January of 2017, the state of Illinois issued an RFP for smart street lighting. The goal of the RFP was to establish state master contracts with vendors to facilitate municipal upgrade of street lights. Those municipalities, cities and town throughout Illinois could upgrade their street lighting systems, so going from old style lighting -- so that would be high pressure sodium, mercury vapor, metal halides, old style lighting -- to new LED-based lighting.

So a municipality wouldn't need to do a procurement. They could do the upgrade straight off the state master contract.

Three vendors were awarded. The announcement was made in December 2017. That is public. For information, the three vendors are Johnson Controls, Globetrotters Engineering, and TEN Connected Solutions. Next slide please.

This slide shows the high level view of a street light architecture, a smart street lighting architecture. You have the light fixtures, and these are the light fixtures that attach to a street light pole. So in the industry these light fixtures are called luminaires.

So you have the luminaires. Attached to the luminaires are small controllers, wireless controllers. They attach via typically a seven-pin receptacle. And the wireless controllers enable a central management system to communicate data and receive data from the luminaire.

So the wireless controllers are connected to the central management system by backhaul communications network. And that could be high bandwidth or low bandwidth.

In the industry you may see the term adaptive controls. And that relates to the central management system, the backhaul communications network and field devices. And field devices means the controller, the small controller device that fits on top of the LED luminaire. So next slide please.

So this gives you an example of an LED street light. The cobra head -- so they're called cobra head luminaires and that's given by the shape of the luminaire -- is the most popular type of luminaire. And you'll see on the photo on the top right a wireless controller and that is attached to the luminaire and so that - you'll often see that as you, you know, look outside and you see these LED lights and that small round object on top of the luminaire is a wireless controller.

Other types of light fixture are what's known as decorative and that's the photo at the bottom of the slide. And these light fixtures are - well this is just one example of a decorative light fixture. And the wireless controller typically fits inside of that decorative light fixture. So that's where the controller would be in that light fixture. Next slide please.

So what are the benefits of upgrade? Why are municipalities throughout the world upgrading their street lights from the old style lighting to LED-based lighting? Well the principal reason are cost savings.

When you go from old style light to LED-based lighting you have significant energy savings. The electricity used by an LED light is much less than the old style lighting.

You have cost savings due to that of 50%, 60%, 70% plus. So really a large amount of cost savings accrue from just going to LED-based lighting. In addition, with LED-based lighting you have much less maintenance. So LED lights require less maintenance than the old style lighting. That's also a big cost driver.

So just those two factors alone are really the principal driver for the upgrades. And this means that you have a business case. Municipalities typically have a business case where a payback is in just a few years. And because of the cost savings this allows innovative financing models and municipalities can have.

For example, they can obtain a municipal bond or loan or enter into an energy - what's called an energy performance contract with a vendor whereby the vendor will install and operate and maintain the street light infrastructure all at a monthly charge, which is often less than what the municipality was paying the utility company before the upgrade.

So that really is the driver for the upgrades. Now some additional benefits are that you have a higher quality light with LED-based lighting. It can be much more controlled. For example, the color of LED lighting can be controlled from, you know, an orange type of light through to a whiter, bluer type of light.

You have additional energy savings possible with adaptive controls. For example, you could program the lighting to go to 50% of their lighting level when there's no cars or pedestrians on the road. And then when the lighting - when the sensors detect those movements you bring the lighting back up to 100%.

Maintenance alerts via adaptive control so the light itself can alert the central management system that maintenance is required. And then you've got all the additional value add services, smart city type services because of the street light infrastructure. And I'll be talking about those shortly. Next slide please.

So this slide gives you - shows you an example of a street that's been upgraded to LED-based lighting. And you'll see on the right there that the light here is very white and illuminates the road well, better than the sort of orange glow on the left side.

And this is particularly suitable for, you know, commercial streets or streets where safety is a priority. As municipalities have upgraded to LED-based lighting, some initial feedback in residential areas was that the lighting was too bright and too white, and so municipalities upgrading now will often tend to put a LED light that has an orange glow in the residential areas. So even though it may not be as bright or as safe, that is what the residents are wanting in their areas.

So that's an example of, you know, before and after of LED lighting. Next slide please.

Why is smart street light architecture a good foundation for smart city applications? Well, you have a structure, a light pole, that has power fed to that light pole, so that enables other devices, sensors, actuators, to be installed on the light pole.

When somebody is replacing a light fixture, it is very cost effective to also put in other devices at the same time if that's what the city wants to do. So for example environmental sensors, air quality sensors, would be an example.

With the street light architecture you have a communications network available and then you have a communications network and communication back to the central management system and also you have a wide coverage - geographic coverage of street lights.

So for these reasons a street light architecture is a good foundation for smart cities' applications. Next slide please.

So in this slide I highlight some of the benefits of a street light architecture that relate to the lighting itself. So with a smart street light architecture you have, you know, operational monitoring and control of the street light so, you know, a person at the central management system is able to monitor the power usage and status of each fixture as I mentioned by automatic maintenance alerts.

And asset management is another one. With this architecture you know the type of lights and the location that light is at with this system, I mean, I've heard of many municipalities with our current old style lighting not knowing that information, having lost records, et cetera.

You are able to have control of the street lights by, for example, turning the lights on during the day in the event of a storm or in an emergency response situation, if there's an emergency in a particular location you could decide to bring up the street lights to maximum brightness.

And then as street lights are installed they can automatically register and commission themselves to the central management system via integrated GPS. Okay next slide please.

So here's a few examples of value add services or smart city type applications that could be enabled by a street lighting architecture. So there's an application out there for gunshot detection whereby acoustical sensors on the light poles are able to use triangulation to detect and predict where the gunshot comes from and then based on the location the street lights are lit up to maximum brightness.

Video monitoring for security, environmental quality sensors, chemical radiation detection, smart park and smart waste management, quite often these smart city applications acquire a small gateway node to communicate with the sensors on the parking spots of the waste trash cans and so those gateway nodes can be placed on the street light poles.

Public messaging, digital signage, and then a wider sport band network could be made available. So there were other applications. This is just an example of some smart city applications. Next slide please.

So I just highlight here the bullet points of what a municipality would need to do to upgrade their street light architecture. I don't have time in this presentation to go through each of these in detail but, you know, this just gives you the bullet point steps to upgrade. And next slide please.

And then if there is any aspect of this presentation you want more information about or want more details on, and if it's not answered in this presentation then just feel free to email me or call me. I'll be happy to discuss with you anything about smart street lighting and the RFP and et cetera, so thank you for your time and I'll hand back now to David.

David Forscey: So thank you very much, Essam. And thank all of our presenters for their time and presentations today. This was a great discussion and my hands are a little tired from writing so many notes, personally.

We're going to open up the webinar for questions so I'll turn it over to Katherine in a moment. But I do have one burning question that I have to ask Essam. Essam, how are you and others and vendors considering the security risks inherent in smart luminaires?

So for instance, you know, when considering where you would actually deploy gateway nodes, you know, you probably want to make sure that they're not an isolated street where someone could obtain physical access without any monitoring.

So is that something you're considering?

Essam El-Beik: Yes, I mean in the RFP we had a set of security requirements related to the communication network. You know, with respect to the texture itself, typically this is, you know, basically a luminaire at the top of a light pole with a wireless controller.

If that were to go down, if that individual luminaire were to be vandalized, there'd be an alert at the central management system and, you know, somebody would go out to replace that, but that would not affect the other, you know, luminaires in the architecture.

But in terms of the communication network, the backhaul network, and depending on the type of wireless communication you use, then you can have security in there, so.

David Forscey: Well thank you very much. And with that, Katherine, take it away.

Katherine Bates: Okay, thanks to everybody for the great presentations. I also was writing a lot during it so I learned a lot. We have some questions, specifically for New York. What state level initiatives in New York led to the dramatic increase in broadband access, from your map that you showed from 2015 to 2018? That was pretty powerful.

Mahesh Nattanmai: So state level, like Lisa said, 2015 we - governor announced a New York broadband program which I have a link on the Web site. There's a lot of good information on that Web site. The state really came up with a consolidated plan of investing about half a billion dollars, $500 million, which is what was, you know, distributed through the three different phases so to say.

And it's a combination of the $500 million and also a public private partnership. So the grand opportunity was laid out in such a way that anybody, any - most of the vendors -- these are the broadband providers -- who would submit a proposal that would leverage the existing infrastructures and also provide up to I believe -- I could be wrong -- I think minimum requirement was 10 meg and it kind of scales up to 100 meg.

And also there is another provision I think as part of the Time-Warner consolidation with I think one of the other provider that was a requirement by our Public Service Commission to provide some of the communities with a higher broadband.

So that was one of the point that was enforced as part of that agreement with Comcast.

And I think the recent one actually allows for even satellite to be an option, so it doesn't have to be just land line, so it's a land line, mobile, and now even satellite is allowed in phase three.

Katherine Bates: Okay, that was a question actually, so I'm glad you answered that. It says "Is the New York - did the effort include wireline, wire life satellite or is the focus just wire lined?"

Mahesh Nattanmai: All three combined.

Katherine Bates: Okay. And were there service tier limits that providers had to deliver during that process? And you said it was ten one?

Mahesh Nattanmai: Ten, yes.

Katherine Bates: Okay.

Mahesh Nattanmai: It was ten one. Yes.

Katherine Bates: Okay. And also in that question was "Is - in the New York State are there public utilities providing broadband or all the providers private?"

Mahesh Nattanmai: I believe it's mostly private.

Katherine Bates: Okay. Okay, thank you. And then I have a question that really I'd like to broaden it out to everybody. Why did the states decide they needed to act on these Smart State Initiatives at the state level? Besides cost savings, what other things went into these efforts, like street lighting, Telehealth, and all the stuff that Virginia's doing?

So I'm going to hand it to David Ihrie first from Virginia.

David Ihrie: Yes, sure, thank you. So you know, I think a lot of the emphasis is really around economic development for us. This is clearly a growing and evolving set of capabilities that's going to drive a lot of economic development in the future.

You know, certainly, you know, as we see increased urbanization going on both in Virginia and globally, you know, this set of technology is going to become more and more important.

And I think that in the Virginia case, we really have this emphasis on not wanting to leave behind, you know, the less densely populated areas of the state, so what can we do to make sure that there's, you know, equitable access to the types of technology that we think will be important going on in the future?

And certainly the other times and things that you mentioned, the cost savings, the better delivery of government services and so forth.

Katherine Bates: Okay, I'll then - Illinois. Essam.

Essam El-Beik: Yes, so the key factor here is enabling shared services between municipalities. Outside of the Chicago metro area in Illinois, you know, so Central Illinois, South Illinois, there are many rural communities and so, you know, we want to make sure that these communities and cities and towns benefit from smart city applications.

And so we feel that by doing the state level, having these state level initiatives that we're able to help the rural communities that may not have all the resources that Chicago has. But that was - that's a key driver for this.

Katherine Bates: Okay. And New York.

Lisa Ullman: Yes, I think that, you know, this is just one of many initiatives I think that, you know, we've been looking at in the state to try and improve access to care, support higher quality care, support care that's coordinated and. patient centered.

You know we have other efforts to, you know, that are engaged in trying to avoid unnecessary hospitalizations, promote better health outcomes, lower cost, and I think these technologies, you know, started to emerge over the last few years, you know, and they weren't just something that we pursued, it's something that, you know, people have brought to us as ways that they've identified to help us achieve these objectives.

So I just think as the technology has increased it has just, you know, increasingly, you know, appeared to be just another way that we can help address some of these objectives and meet these needs.

Katherine Bates: Okay, that's great. And then have you seen these or similar smart initiatives at the county or the city level take off since you've started to do your process? And this is particularly for Virginia, because you've started it at the state level, have you seen it push down to the county and city level where they've actually taken on the efforts themselves?

David Ihrie: So I think what we've seen, you know, as we started the state level activity, as I mentioned in the presentation that there were already a number of local or, you know, community driven efforts underway.

I think particularly notable has been, you know, we call the peninsula of Virginia, Norfolk, Virginia Beach, that area, where they've been dealing with, you know, a number of issues of persistent flooding and have managed to pull together a very active community effort and scientific effort to kind of address some of those issues.

And as we've gotten into it more and started to publicize what we're doing around the Commonwealth, we're getting an increasing number of communities that want to participate.

So I've been - you know, I wasn't sure what to expect but I think we've had a very strong expression of interest from a variety of different communities of various types and so I think we'll see more of that as we go forward. And again at the state level we're trying to enable and support those communities that want to start or further the activities they already have underway.

Katherine Bates: Okay, and actually that question can go over to Illinois also. You've done your street lighting. Have you seen communities -- I know they've participated in the process but -- have you seen them take on their own smart communities as a result of the work that Illinois has done? Because I know Illinois has also done work outside of just the street lighting on the Smart State's initiative.

Essam El-Beik: Yes, I mean there's a number of communities in Illinois that have advanced their Smart City initiatives. I mean, obviously Chicago has a lot of activity

regarding smart city activities as a number of other cities as well. Aurora comes to mind. They have their own fiber network. City of Decatur as well.

The state is working with just recently built out a fiber network. So yes, I mean, there are - there is activity happening in some cities in Illinois and we just want to make sure that, as I said, all cities in Illinois and communities benefit in the shared services and that we facilitate easy sort of procurement of, for example, street lighting.

Katherine Bates: Okay, and then one more question related to street lighting and this'll be our last. There were some other - there actually other questions that we will answer offline. We'll connect people with that because we don't have time for all the questions. And particularly on Medicaid reimbursement, I'll let that happen offline.

But Essam, was there increased light pollution as a result of the LED lighting that was deployed? Because your pictures were pretty stark in the difference. So were there complaints about that?

Essam El-Beik: So, and when municipalities have deployed LED street lighting, there has been complaints, not necessarily in Illinois but, you know, reading the literature throughout the world, there are complaints. And from what I can gather, this is - a resident has complained that the street light is too bright or it's shining in the house.

And in fact with LED-based lighting you can - first of all you can control where it shines so you have better directional control and also you can control what's called the color temperature.

So these complaints originated principally by municipalities installing a very white or blue light, for example, 6000 Kelvin in a residential area. So the resident would go from having a soft orange glow type light to a white or blue bright light and that's where the complaints came in.

When a municipality - and some municipalities have had to stop the upgrade, go back to those residential areas and change their color temperature to a more orange color which is about 2700 Kelvin or 3000 Kelvin and then that satisfies the residents.

Then again in terms of pollution to the night sky, if you have the right structure then that is addressed. And I would argue that with LED-based lighting and its directional ability to control the direction of lighting then that is better addressed than the old style lighting. You had virtually no ability with an old style light to control its direction.

But good question, thanks.

Katherine Bates: Well thank you all for joining us today. And I'd really like to thank the speakers for sharing their important information with us. The work you do is important to move us at the state level and the community level to the next smart state.

So I appreciate that and I'm also really excited about NGA's smart state efforts and we look forward to hearing more about that project, David, as it goes forward. And look forward to you sharing that with us.

David Forscey: Of course.

Katherine Bates: So thank you all and I also want to remind you that we have our monthly webinars. It's the third Wednesday of the month at 2:00 pm eastern time. Next month is infrastructure week and we're going to talk about successful models and best practices for rural broadband deployment on May 16 at 2:00 pm eastern time.

And if you have any questions about BroadbandUSA, please visit our new Web site and if you have any input on our new Web site please give us that at BroadbandUSA@ntia.doc.gov.

Thank you all.

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