



The U.S. Infrastructure Investment & Jobs Act

Strategy Guide | Transportation and
Core Infrastructure Edition
January 2023

*A combination of both physical and digital
infrastructure will deliver transformational outcomes*

in collaboration with
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Foreword

The Infrastructure Investment and Jobs Act (IIJA) is a once-in-a-generation opportunity to improve citizen outcomes for decades to come

“The 2020s will be one of the most transformative periods in transportation.” USDOT Secretary Pete Buttigieg, March 23, 2022.

Secretary Buttigieg’s quote from SXSW succinctly captures the sea of change we expect to experience in the coming decade. What makes this change transformative is the close connection between transportation, public safety, economic strength, cyber resiliency, and sustainability. With a once-in-a-generation investment in U.S. infrastructure underway, this vision now has the financial backing to become a reality.

The Infrastructure Investment and Jobs Act, a \$1.2 trillion investment in U.S. infrastructure, was passed into law in November 2021. About half of the investment is allocated to surface transportation—roadways, railways, airports, seaports, and public transit. The other half is planned for core infrastructure—sustainability, smart grid, broadband, education, and related investments. To ensure equitable distribution of funds, we must learn from past infrastructure initiatives.

Investment in physical infrastructure is critical; however, decision-makers looking to optimize outcomes should recognize that modern infrastructure is a combina-

tion of physical and digital assets. We call this **The New Infrastructure**, a synergistic interplay that drives tangible social and economic outcomes. Physical infrastructure alone cannot fully address the multitude of needs of our modern, information-driven economy, nor does it ensure future success.

Digital infrastructure, built on core superpower technologies—IoT, 5G, AI, and Cloud—will extend this New Infrastructure build-out to create a lasting impact. Digital infrastructure investments may include emergency prevention and mitigation, firewall systems, cyber law enforcement, remote monitoring services, and everything in between. These technologies are available today, deployment-ready, and deeply interwoven into our daily lives. The New Infrastructure, a powerful combination of physical upgrades and digital advancements, will foster unprecedented outcomes like:

Vision Zero:

There were 38,680 traffic fatalities in 2020, the highest yearly total since 2007. Combining physical infrastructure upgrades with new digital technologies can help reduce deaths and achieve Vision Zero.¹

¹ Shepardson, David, Reuters, “U.S. Traffic Deaths soar...” June 3, 2021.

Climate:

Between 2000 and 2014, the use of 511 intelligent transportation systems across U.S. cities led to a significant decrease in urban traffic congestion, saving over 10 billion pounds of CO2 emissions.²

Economic Growth:

Infrastructure investments can add as much as \$3 to gross domestic product (GDP) growth for every \$1 spent.³ Incorporating new technologies into physical infrastructure can help accelerate and multiply this impact.

Cyber Resiliency:

The cumulative cost of ransomware to its victims is projected to be \$265 billion annually by 2031, representing a 30 percent annual growth rate in damage costs. As nearly every aspect of

personal, social, and economic interactions becomes increasingly digitalized, it is critical to invest in infrastructure that enables and supports cyber resiliency for businesses and institutions, Internet of Things (IoT) and smart devices, and ultimately, all community members.⁴

Physical Security:

New infrastructure investments will create new water and power plants and transportation, airports, and transit facilities. These new infrastructure components will need to be equipped with the latest safety and security systems to ensure that they are protected and not subject to compromise. Securing The New Infrastructure will remain a key priority for investment.

² Cheng, Dr. Aaron, London School of Economics, "Technology more effective at managing traffic..." May 26, 2020.

³ Council on Foreign Relations, "The State of U.S. Infrastructure" November 8, 2021.

⁴ Braue, David, Cybercrime Magazine, "Global Cybersecurity Spending To Exceed \$1.75 Trillion From 2021-2025 " September 10, 2021 ([Link](#)).



The New Infrastructure

The New Infrastructure focuses on solutions to advance enterprise resiliency by enabling preparation for, response to, and recovery from cyber threats as we enter the digital age. Cyberattacks go well beyond disrupting operations but also attack critical data—cyber resiliency allows organizations to protect and quickly recover from breaches while permanently protecting valuable data. This can include models and data that are integral to AI algorithms, using confidential compute, secure enclaves, and zero trust architectures.

This eBook includes digital infrastructure strategies and solutions related to IIJA funding for transportation and core infrastructure projects across the country. These solutions are all powered by Intel and Dell Technologies and enabled by an ecosystem of partners that align with Dell's mission to leverage its people and portfolio of products and services to lead community-centric initiatives supporting next-generation infrastructure and digital inclusion. These solutions advance [Dell's 2030 Progress Made Real Social Impact Agenda](#), which looks to deliver enduring results for one billion people by 2030.

When identifying shovel-ready projects and infrastructure upgrades, it is essential to think about how digital infrastructure can help improve equitable quality-of-life outcomes for communities of all types and sizes including, but not limited to, public health and safety, educational attainment and employment opportunities, environmental sustainability, cyber resiliency, and economic mobility. The information in this eBook can help define and drive transformational projects across the nation.

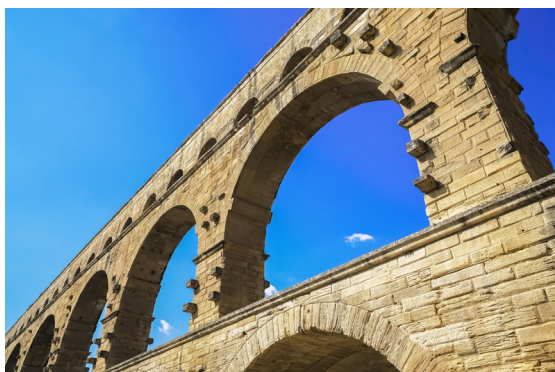
"It's clear that technology and education will drive human progress and transform change. To empower everyone to be able to take part in the emerging global digital ecosystem, universal accessibility will drive recovery and create flourishing communities. It's core to who we are as a company and how we work with customers and communities to drive progress."

- Jessica Anderson,
Director of Strategic Giving,
Dell Technologies

1

Infrastructure is Evolving

The definition of “infrastructure” is not static



Aqueduct, 312 B.C. - A.D. 226



Steam-powered railways, 1784



Electricity infrastructure

Advances in infrastructure have driven growth and prosperity for millennia. The basic structures, systems, and facilities that communities use for transportation, water, energy, and communications have been vital to economic and social development.

History teaches us that the rise of city planning, roads, railways, electricity, and other critical technological innovations layer upon each other to define the word ‘infrastructure.’ Before industrialization, infrastructure consisted mainly of roads and canals. Canals were used for transportation and irrigation. Sea navigation was aided by ports and lighthouses. A few developed cities had aqueducts that serviced public fountains and baths, while fewer had sewers.

Between 1700 and the 1900s, many new and novel advances in infrastructure occurred, including railways, electricity, water distribution, telegraph networks, and the subway. With the advent of the 20th century, the first electrical power station was built in England, which set the stage for the modern power transmission and distribution grid. Soon after, Marconi harnessed radio waves to create instantaneous long-distance communications.

Throughout history, infrastructure developments have driven advances in civilization, supporting the growth of modern industrial economies. Infrastructure innovations are complex, unpredictable, capital-intensive, and anything but static.

Today, in the 21st century, the definition of the word infrastructure needs to evolve and change to comprehend the pace of human innovation and technological advancement to include market-ready technologies that can deliver outsized positive community outcomes. This is The New Infrastructure: a combination of physical and digital infrastructure that will improve the lives of all.



The New Infrastructure: The Evolution from Dirt to Digital

1

4,600 years ago

The first street grids for city organization



Major cities of the Indus Valley civilization in modern-day Pakistan



Blocks divided by a grid of straight streets running north-south and east-west



Each block subdivided by small lanes

2

2,000 years ago

Roads, Bridges & Waterways



Romans are among the first to see infrastructure engineering and investment as strategic



Major development and expansion of roads, bridges and aqueducts



Advancements helped secure safety of trade routes

3

200-300 years ago

Steam & Steel Revolutionizes Transport



The invention of the steam engine makes railway transportation possible



Railways lead to an improvement in transportation, agriculture, and manufacturing during the 1800s



The way people and goods moved across long distances is transformed



These innovations set the stage for innovations like internal combustion engines and jet turbines

4

100 years ago

Rapid modernization begins to reshape the global landscape



The first electrical power station was built in Newcastle upon Tyne, England in 1901



Radio waves were first used for broadcasting and, five years later, instantaneous long-distance communications were enabled.



In 1969, the first two nodes of what would become the ARPANET were interconnected.



Commercial internet service providers (ISPs) began to emerge in the late 1980s.



In 1982, the Internet Protocol Suite (TCP/IP) was standardized, and the concept of the Internet was introduced.



By the late 1990s, traffic on the USA public Internet grew by 100 percent annually.

5

Today

Digital Becomes The New Infrastructure



Massive technological change driven by the internet, developments in semiconductors, and improved telecommunication



Combinations of innovation create new developments like Cloud, 5G, AI, and IoT



These developments create the new digital infrastructure we have today



By combining digital and physical infrastructure, these technologies create new value for communities and policymakers alike

2

What is in the Infrastructure Investment and Jobs Act?

\$1.2 trillion in total funding over ten years

The IIJA represents a generational shift in what constitutes infrastructure and how projects will get defined and deployed. The key stakeholders and participants need to ensure that it includes a focus on digital transformation for infrastructure. This means not only investing in core digital infrastructure, such as wireless broadband and IT systems, but also taking advantage of opportunities to integrate digital technologies into physical infrastructure including roads and bridges, electric grids, water systems, airports, trains, and more. Upgrading and securing our infrastructure with digital technologies will dramatically improve how we utilize, maintain, and manage the systems that underpin our economy and our lives.





\$25M in INFRA Dollars for I-90 Austin Bridges Improvement Project

The project, funded by an IIJA Infrastructure for Rebuilding America (INFRA) award administered by U.S. DOT, will rebuild eight overpass bridges and rehabilitate two mainline bridges along the I-90 highway. It includes improvements to ramp connections and traffic signals around the bridges, a new network of ADA-accessible multimodal sidewalks and trails, and the modernization of stormwater infrastructure.

Over \$33M in Broadband Infrastructure Deployment Funds for Dilkon Chapter, AZ

The Dilkon Chapter of the Navajo Nation, AZ will use their awarded Broadband Infrastructure Deployment funds, administered by U.S. DOE, to install fiber covering 3,643 unserved Native American households, businesses, and community institutions with a minimum of 25/3 Mbps wireless service.



\$3.43M for Borley Heights Relief Community Flood Mitigation Project



Heavy rainfall causes large water flows due to poor drainage systems and overflow from the Pine Island Bayou, which backs up ditches which then flood the local area. The Borley Heights Relief is a drainage project, funded with IIJA dollars through FEMA's Building Resilient Infrastructure and Communities (BRIC) program, which will address shallow and moderate home flooding that has and will continue to harm the community if it is not addressed.

\$8.74M to the South Jersey Transportation Authority for the "Smart and Connect" Atlantic City Express Highway Project

In August 2022, the South Jersey Transportation Authority was granted over \$8 million through the U.S. FTA's Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) program to transform the Atlantic City Expressway into a smart, connected corridor. The goal of the project is to support future connected and automated vehicles using cellular vehicle-to-everything technologies.



The IIJA law allocates about \$1.2 trillion in total funding over ten years, including \$550 billion in new spending during the next five years, split between investments in transportation systems (\$284 billion) and investments in core infrastructure (\$266 billion), including:

Transportation: roads, bridges, passenger rail, freight rail, airports, ports, waterways, public transit, electric vehicles, and safety systems.

Core Infrastructure: the power grid, water systems, wastewater systems, climate and environmental initiatives, advanced energy, broadband communication services, and cyber resiliency programs.

“This is a major victory for Louisiana and our nation. This infrastructure package will rebuild our roads and bridges, increase access to high-speed internet, strengthen our electric grid, add levee protection, and improve flood resiliency. After almost every corner of our state was hit by natural disasters in the last year, we must have the federal investment to protect us from future storms.”

-U.S. Senator Bill Cassidy, M.D. (R-LA)

Transportation investments include immediate funding for highway, safety, transit, passenger rail, and aviation activities. Funding will be allocated to make our nation's highways more efficient and safer for passenger and commercial transportation. Beyond road systems, investments will repair our nation's transit systems, improve intercity passenger rail service, and modernize airport infrastructure across the country. The bill will provide the largest investment in history in public transit, as well as the largest investment in roads and bridges since the construction of the interstate highway system.

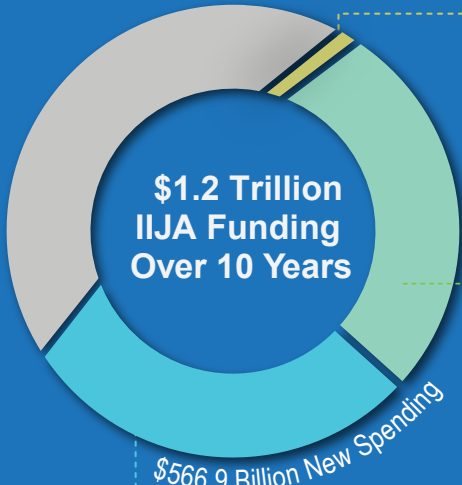
In addition to new fixed guideway capital projects and other small transportation-specific projects, the Capital Investment Grants administered by the Federal Transit Administration (FTA) under the IIJA provide funding for Core Capacity improvement projects that upgrade existing corridors to handle increased demand. To be eligible for IIJA funding, these core infrastructure projects must increase capacity for existing fixed guideway system corridors by at least 10 percent. This may include the acquisition of real property, rights-of-way, double tracking, wayfinding improvements, electrification, and more.¹

¹ The White House, “Building a Better America: A Guidebook to the Bipartisan Infrastructure Law for State, Local, Tribal, and Territorial Governments, and Other Partners”, January 2022

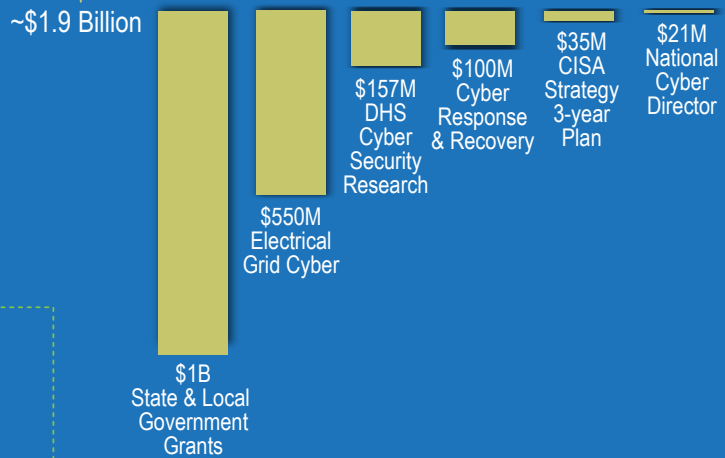
What's in the IIJA?



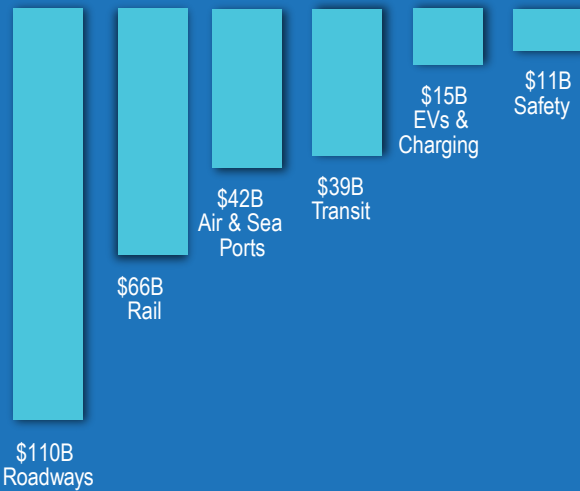
Federal funding is distributed to states and localities via Formula Grants & Competitive Grants



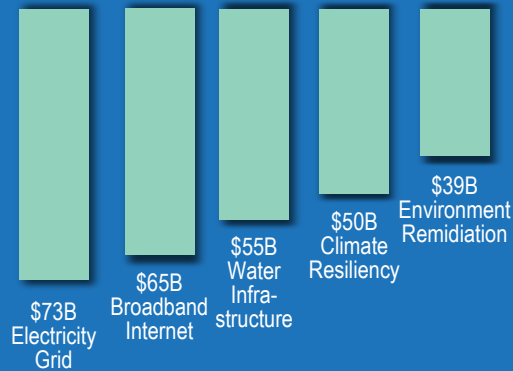
National Cybersecurity Strategy



Surface Transportation



Core Infrastructure



Local Government Opportunities

- Local governments (cities, counties, communities) will receive sub-allocations of formula grants based on population and scale of infrastructure and be able to compete for federal grants

Competitive Grant Process:

- ~\$120 billion of competitive grants available over first 5 years
- Guidelines determined by federal agencies administering each program
- Grants available to state & local government

Foreword

Infrastructure is Evolving

What's in the IIJA?

Digital Tech for Innovation

Positive Citizen Outcomes

Cyber Resiliency

Infrastructure Solutions

Getting Started & Contacts

Digital Technology Will Drive Infrastructure Innovation

Increased impact of “superpower” technologies on transportation infrastructure

Over the last several decades, the digital transformation of every aspect of human and business affairs has been profound. Compute, network, software, and platform technology innovations have become a critical part of our development. The effects are visible everywhere, including our infrastructure. It can be tempting to look at the progress and sophistication of our transportation, energy, telecom, water management, and other systems, and believe the impact of technology is nearly complete. In fact, it's only just begun.

Multiple “superpower” technology developments, evolving in parallel, are reinforcing and accelerating one another: ubiquitous computing, pervasive connectivity, edge to cloud infrastructure, and AI. Cloud infrastructure resources are providing

unprecedented computing scale. Faster, more pervasive wireless networks, 5G, and mobile computing devices are extending the reach of computing. Artificial intelligence (AI) is bringing value to the data generated and collected by these devices. Embedded technologies at the edge are connecting and integrating a broad array of physical equipment and infrastructure systems with digital capabilities.

We have entered an era where residents, businesses, and institutions are beginning to understand the outsized impacts and benefits that technology can bring to our daily lives. Enabling physical infrastructure with embedded sensors, automation, communications, and computing will enhance and extend its value to support a more sustainable and equitable future.

A MASSIVE INFLUX OF DATA

By 2025, global data creation is projected to grow to more than 180 zettabytes, a 180% increase from 2020.

Each of these technologies are powerful on their own, but together their impacts are multiplied. Human-connected devices and machine-connected IoT devices generate exponentially more data. Connected networks enable us to capture data and deliver it to the cloud for analysis. AI models can then analyze and capture new insights and optimize the way machines, systems and people interact.

The core digital technologies driving digital transformation -- ubiquitous computing, pervasive connectivity, cloud to edge infrastructure and AI -- have the potential to multiply the impact of physical infrastructure investment and create massive new opportunities for states, counties, cities and

communities. The combination of the physical infrastructure with digital infrastructure is what we call **The New Infrastructure**.

Beyond enabling and augmenting this system of systems, The New Infrastructure focuses on solutions to advance enterprise resiliency by enabling preparation for, response to, and recovery from cyber threats as we enter the digital age. Cyberattacks go well beyond disrupting operations, they attack critical data—cyber resiliency allows organizations to protect and quickly recover from breaches while permanently protecting the data. This can include models and data that are integral to AI algorithms, using confidential compute, secure enclaves, and trusted domains.

Superpower Technologies



Ubiquitous
Compute



Pervasive
Connectivity



Cloud to Edge
Infrastructure

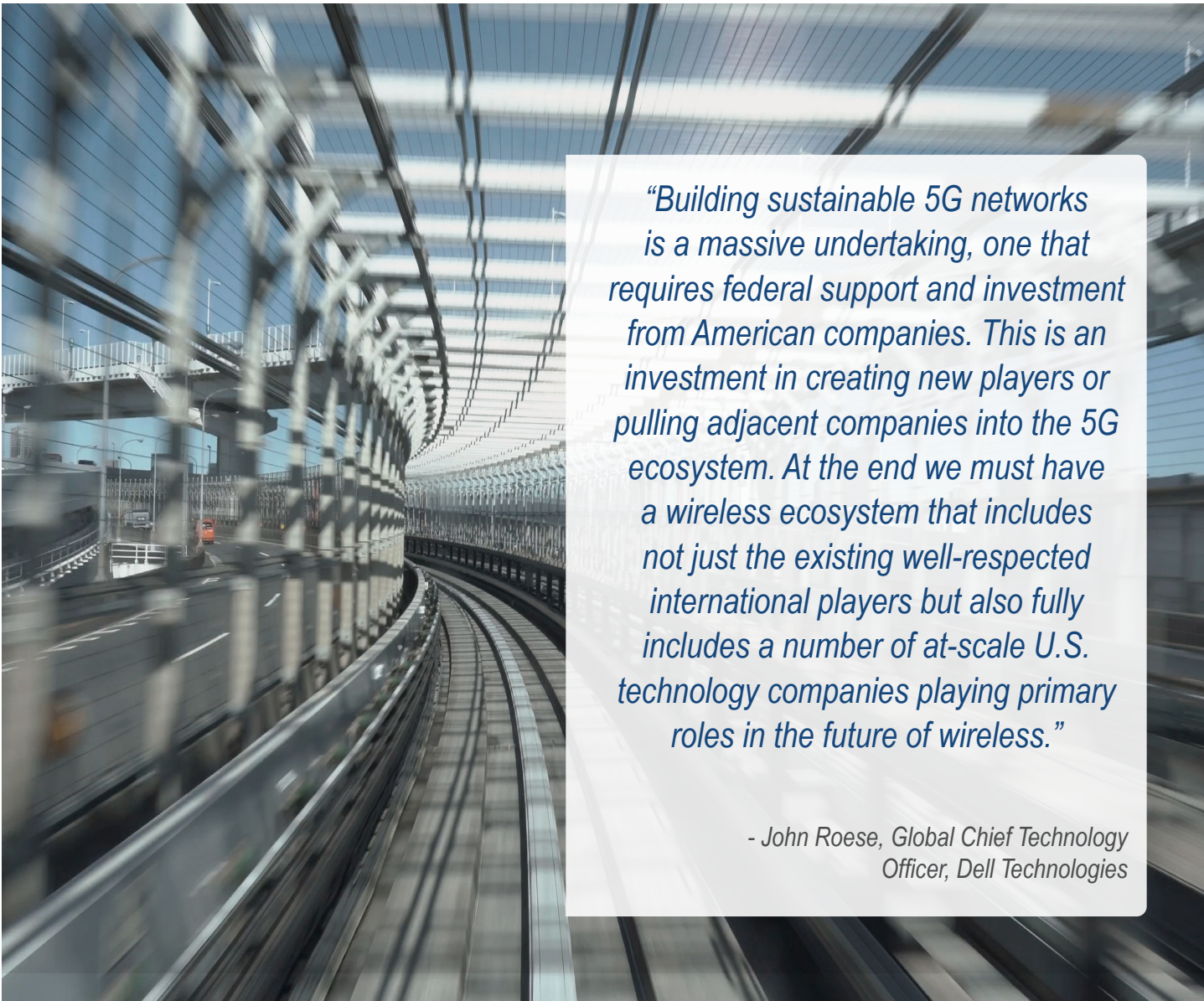


Artificial
Intelligence

“Digital technology is transforming the world at an accelerated pace, driven by what I call the four “superpowers”: cloud, connectivity fueled by 5G, artificial intelligence (AI) and the intelligent edge. They are superpowers because each expands the impact of the others. And together, they are reshaping every aspect of our lives and work. This goes straight to Intel’s purpose and my own passion: creating world-changing technology that touches and improves the lives of every person on the planet.” - Pat Gelsinger, CEO, Intel Corporation

The New Infrastructure

The New Infrastructure refers to the combination of physical and digital infrastructure, which is built on the core technologies of ubiquitous computing, pervasive connectivity, cloud-to-edge infrastructure and AI. These technologies have the potential to multiply the impact of physical infrastructure investments and create massive new opportunities for states, counties, cities, and communities.



“Building sustainable 5G networks is a massive undertaking, one that requires federal support and investment from American companies. This is an investment in creating new players or pulling adjacent companies into the 5G ecosystem. At the end we must have a wireless ecosystem that includes not just the existing well-respected international players but also fully includes a number of at-scale U.S. technology companies playing primary roles in the future of wireless.”

- John Ruese, Global Chief Technology Officer, Dell Technologies

4

The New Infrastructure Helps Enable Positive Community Outcomes

Combining physical “concrete and steel” infrastructure with digital infrastructure

The \$25 trillion U.S. economy relies on a vast network of public infrastructure, including roads, bridges, ports, transit systems, airports, electrical grids, water treatment systems, inland waterways, dams, levees, public schools, and waste management and treatment systems. Since the 1960s, when much of the country’s major civil infrastructure systems were developed, the U.S. population has more than doubled. Now, much of the nation’s existing infrastructure is in need of upgrades, expansion, and modernization as it extends beyond its intended lifespan.

Poorly maintained infrastructure can impose large costs on the U.S. economy. The American Society of Civil Engineers (ASCE) has compiled regular “report cards” on the state of U.S. infrastructure since the 1980s. In its 2021 report, the ASCE found that the nation’s infrastructure averaged a “C-,” up from a “D+” in 2017 and the highest letter grade in twenty years. Still, in 2017 the group estimated that there was an “infrastructure investment gap” of nearly \$2.6 trillion this decade that, if unaddressed, could cost the United States \$10 trillion in lost GDP by 2039.¹

¹ American Society of Civil Engineers, “2021 Report Card on America’s Infrastructure”, December, 2021 ([Link](#))



Catastrophic failures such as bridge collapses or dam breaches are a huge threat to human safety. In addition, inadequately maintained roads, trains, and waterways have a wide range of impacts on our economy including traffic jams, unnecessary pollution, disrupted supply chains, and more. For example:

- Delays and avoided trips caused by traffic congestion in 2021 cost the U.S. economy over \$30 billion, and 248,000 American jobs,² while delays and avoided trips due to the poor state of U.S. airports cost the economy over \$35 billion per year.³
- Nearly one in three bridges in the U.S. need repair, and there are 167.5 million daily crossings on 43,578 structurally deficient U.S. bridges in poor condition.⁴
- The majority of the nation's electric grid is aging, with some components over a century old — far past their 50-year life expectancy — and others, including 70 percent of transmission and distribution lines, are nearing the end of their designed lifespans. These problems result in power outages that end up costing U.S. households up to \$169 every year.⁵
- The telecommunications industry has spent over \$253 billion in capital investments since the launch of 4G in 2010, followed by \$27.4 billion in 2019 to expand capacity, increase coverage, develop infrastructure, and upgrade technology to support 5G. However, families at the top fifth income threshold (over \$80,700) are still five times more likely to have access to broadband than a household at the lowest fifth income threshold (\$34,800).⁶
- Poorly maintained roads are bad for the environment—the impact of keeping roads in good shape offsets pollution generated during road construction and reduces greenhouse gas (GHG) emissions. Extending the life of pavement through preventative maintenance can reduce GHG emissions by up to two percent and reduce costs for transportation agencies and users.⁷

There is an “infrastructure investment gap” of nearly \$2.6 trillion this decade that, if unaddressed, could cost the United States \$10 trillion in lost GDP by 2039.

*- American Society of
Civil Engineers (ASCE)
2021 Report Card*

² US Travel Association, “Study: Road Congestion Cost U.S. Economy...” May 22, 2019 ([Link](#))

³ Council on Foreign Relations, “The State of U.S. Infrastructure” November 8, 2021 ([Link](#))

⁴ American Road & Transportation Builders Association, “Bridge Report” 2022 ([Link](#))

⁵ American Society of Civil Engineers, “2021 Report Card on America's Infrastructure”, December, 2021 ([Link](#))

⁶ American Society of Civil Engineers, “2021 Report Card on America's Infrastructure”, December, 2021 ([Link](#))

⁷ Wang, Hao, International Journal of Sustainable Transportation, “Quantifying greenhouse gas emission of asphalt pavement preservation at construction and use stages using life-cycle assessment”, January 2019

The budgets to support infrastructure are primarily driven by state and local governments, who must juggle long-term investments with spending on short-term programs while enabling implementation for local, regional, and tribal governments. This uneven pattern of spending has had serious consequences for the nation's economic health. Investments in better roads and bridges, more efficient public transit systems, reliable energy grids, expansive and accessible telecom networks, and environmentally sustainable water management systems can boost job creation, economic growth, physical and digital safety, and overall quality of life.

It is imperative that cities and communities become more sustainable, affordable, and equitable, ultimately providing all residents and workers with more and better quality-of-life opportunities. Infrastructure is increasingly seen as a key driver of the attractiveness and competitiveness of communities, and infrastructure investments directly correlate to increases in real estate value.⁸

With physical and digital worlds becoming permanently intertwined, investment in The New Infrastructure can generate profound impacts for communities across states, counties, and municipalities. The design and development requires a true framing shift around how people interact with physical infrastructure. This shift involves much more than simply modernizing aging infrastructure; ultimately, it should move us toward a more cohesive, intelligent system of systems that integrates physical and digital infrastructure and supports communities in new and novel ways—including building resiliency toward cyberattacks and other digital threats.

We have an opportunity to invest and develop a new generation of digitally-enabled infrastructure systems that are self-sensing, self-controlling, and self-optimizing, providing better outcomes to our cities

and states. Digital technologies have the potential to dramatically reduce the cost and complexity of maintaining infrastructure equipment and systems. The return on investment (ROI) from digitally enabled systems can be realized quickly, sometimes in just months rather than years.

The Infrastructure Investment and Jobs Act will empower states, counties, and local municipalities to make significant modernizations—both physical and digital—that can raise the quality of life for commu-

THE MULTIPLIER EFFECT

Many economists believe that infrastructure spending has a “multiplier effect,” adding as much as \$3 to gross domestic product (GDP) growth for every \$1 invested in infrastructure.

University of Maryland Study, 2014

nities and improve the ability of public agencies and departments to deliver higher quality services. Technologically advanced infrastructure presents an opportunity to invest in a future of continuous and lasting change for the benefit of the public. Compared to traditional infrastructure, it will generate superior long term economic growth, competitiveness, national security, and environmental benefits. It is critical to keeping goods, services, and energy flowing, as well as boosting productivity and ensuring economic development and jobs.

⁸ Sage Real Estate Group, “How the New \$1.2T Infrastructure Bill Could Impact...” November 23, 2021 ([Link](#))

The New Infrastructure

Physical Buildout



Digital Augments



Resulting Outcomes

Safety

Traffic-related fatalities in California were estimated at 1,709 in 2022, a 6% increase from the previous year.

Equity

Project Connect in Austin is aimed at improving transportation infrastructure in order to stimulate the economy & grow the middle class.

Climate

The U.S. transportation sector accounts for 29% of all greenhouse gas emissions, the greatest share of all sectors; electrifying transit can reduce related emissions by 67%.

Economy

U.S. cities using Intelligent transportation systems can save time and money, including more than \$4.7B per year in lost productivity.

Physical Infrastructure



Public Transit



Airports & Sea Ports



EV Charging Stations



Roads



Railways

Digital Technologies



AI



Edge-Cloud



IoT



5G



Cyber Resiliency

The New Infrastructure and Cyber Resiliency

A rise in cybercrime, threat and regulatory focus requires New Infrastructure initiatives to also drive cybersecurity

New Infrastructure

Beyond issues encountered in our physical infrastructure, it is estimated that at least one business, consumer, or device in America will be targeted by ransomware every 2 seconds by 2031 according to Cybersecurity Ventures, the world's leading researcher and publisher covering the global cyber economy.

- **Global cybercrime** costs are projected to have grown by 15 percent per year between 2020 and 2025, reaching \$10.5 trillion USD annually by the end of this period, up from \$3 trillion USD in 2015.¹
- **The cost of ransomware** to its victims (collectively) is projected to be \$265 billion USD annually by 2031, representing a 30 percent annual growth rate in damage costs over the next 10 years.²

This is particularly concerning for mission-critical businesses, departments, and facilities like hospitals and healthcare providers, law enforcement, or first responders.

“[Global cybercrime] represents the greatest transfer of economic wealth in history, risks the incentives for innovation and investment, is exponentially larger than the damage inflicted from natural disasters in a year, and will be more profitable than the global trade of all major illegal drugs combined.”

- Steve Morgan,
Cybersecurity Ventures

Cybersecurity Ventures,
“2022 Ransomware Market
Report”, June 2022 ([Link](#))

¹ Cybersecurity Ventures, “2022 Cybersecurity Almanac: 100 Facts, Figures, Predictions And Statistics”, January, 2022 ([Link](#))

² Cybersecurity Ventures, “2022 Ransomware Market Report”, June 2022 ([Link](#))

Collectively, these impacts cost our economy billions of dollars in lost productivity and reduced efficiency. Investing in the safety, efficiency, and reliability of our transportation systems and physical infrastructure will increase safety for our communities, strengthen sustainability, and help insulate the economy from unexpected disruptions.

Of the significant IIJA funding specifically allocated for cybersecurity initiatives, a \$1 billion State and Local Cyber Grant Program administered by the Department of Homeland Security (CISA and the Federal Emergency Management Agency (FEMA))³ will address cybersecurity risks and threats to information systems owned or operated by state, local, or tribal governments. In addition, \$100 million is allocated to the Cyber Response and Recovery Fund to be held in reserve for state, local and tribal entities to provide support following a cyber-attack.

³ "State and Local Cybersecurity Grant Program," Cybersecurity & Infrastructure Security Agency (CISA) ([Link](#))



Local Governments and Cyber Resiliency

Cybersecurity has become an essential component of disaster resilience

The volume of data that local and regional governments collect, process, and report on has grown exponentially over the past decade—especially since the COVID-19 pandemic led many types of operations and interactions to transition to a digital format. Due to budget constraints, municipalities and other local entities have not been able to invest in the skilled staff and infrastructure necessary to handle and protect their data. These gaps in digital security leave communities vulnerable to cyberattacks, which can

range from malware and phishing to ransomware. About 60 percent of state and local governments across the United States were victims of at least one ransomware attack during 2021, up from one-third in 2020.⁴

Cyberattacks can go as far as shutting down servers, exposing critical data, disabling 911 and other emergency response centers, and interfering with traffic and smart city management systems. Without the appropriate resources to strengthen their defenses, local governments and the communities they serve

\$1 Billion in Funding for State and Local Cybersecurity Grant Program to help States and Territories become more resilient to cyber threats

In September 2022, the Department of Homeland Security (DHS) launched the first-ever cybersecurity grant program specifically designed to support state, local, and territorial governments in strengthening the resiliency of their information systems. The program provides a total of \$1 billion in funding over four years, with \$185 million available for FY22. The goal of this funding is to equip governments across the country to address cybersecurity risks and strengthen the cyber resiliency of new and existing critical infrastructure.

[Learn more](#)

⁴ Sophos, "The State of Ransomware in State and Local Government 2022", September 2022 ([Link](#))

are left extremely vulnerable to these threats. In the public sector, the damage tends to be more severe; post-attack encryption rates for local governments were among the highest at more than 70 percent of all cyberattacks.⁵

For example, the city of Atlanta, GA was targeted by [one of the largest ransomware attacks](#) to any major U.S. cities ever in March 2018. Hackers infiltrated Atlanta’s computer networks and held them hostage for almost a week, demanding over \$50,000 in bitcoin to turn the systems back to the city. The Atlanta Journal-Constitution retroactively estimated that the costs to the city related to this attack neared \$17 million.

A similar ‘[SamSam](#)’ ransomware attack in [Newark](#) forced the city to pay \$30,000 to recover its systems that same year. More recently, in May 2021, the Washington D.C. Metropolitan Police Department was [infiltrated by a group of hackers](#) who exposed department documents including information related to job applicants, a map of the locations of sex crimes, street crews, the use of facial recognition software, and others with raw intelligence on threats following the Jan. 6 attack on the

DELL CUSTOMER SUCCESS STORY: State of Oklahoma Transforms Government IT and Protects Digital Assets

The State of Oklahoma wanted to modernize data recovery and transform their aging IT infrastructure. *Highlights include:*

- Moved 2.6PB of data and more than 10,000 databases to a remote data center
- Enabled future innovation and moved information services forward 20 years
- Eliminated IT silos
- New safeguards against cyberattacks

[Read more](#)

U.S. Capitol. This cyberattack hit Washington D.C. a few months after a ransomware attack effectively shut down Baltimore County’s Public Schools system, bringing classes to a halt for almost a week for over 100,000 virtual students in the midst of the COVID-19 pandemic.

⁵ Government Technology (Verizon), “The Increasing Concern of Public-Sector Cybersecurity in State and Local Government”, September 2022 ([Link](#))

For threat actors, no government agency is too big or too small. There are over 90,000 local government organizations in the U.S. alone. These offices house troves of data, such as personally identifiable information (PII), names, addresses, driver’s license numbers, credit card numbers, Social Security numbers and personal medical information ... All of this data can be held for ransom and/or sold later if it gets into the cybercrime economy. This middle zone of society — where everyday things like schooling, wastewater treatment, health care and law enforcement occur — is at risk for attack.

- Jonathan Reed, *Security Intelligence* (2022)

Driving Innovation in State and Local Government with Dell Technologies Solutions

Leveraging IIJA funding for improved outcomes

To leverage IIJA funding to deploy this New Infrastructure, it is imperative to develop not only a physical infrastructure strategy but also a digital infrastructure strategy. As roads are built, deploy digital technologies that will help reduce traffic fatalities. As traffic lights are installed, plan to augment the project with digital technologies that help reduce gridlock, manage traffic, save time, and reduce emissions. Take a “Dig Once” approach—**dig once** for New Infrastructure projects, assess the outcomes, and deploy digital technologies for future upgrades. This approach will help address the vast potential of the IIJA, and result in the most positive and durable outcomes for communities.

Prioritizing funding opportunities could prove to be challenging to state, county, and local municipalities and their respective agencies and departments. As state and local officials think through their priorities, understanding what technology opportunities they can address will be catalytic.

Achieving the Best Possible Technology Outcomes for Constituents and Communities

For state and local government, technology is critical. Residents and government employees rely on software applications and hardware to access information and to deliver and receive services. IT must provide a broad portfolio of services that range from supporting social and health services, public safety, and law enforcement to facilitating digital service and resources for residents.

Governing bodies at all levels are looking at IIJA programs dedicated to technology and information to help improve the quality, speed, and responsiveness of their services and operations for both transportation and core infrastructure projects. Although the primary focus of the bill is around building and maintaining physical infrastructure like roads and bridges, state and local governments can put IIJA to work in several ways to drive infrastructure modernization, improve digital equity, strengthen security, and accelerate their use of emerging technologies.

Data plays a key role whenever constituents interact with their leadership, when technologists plan and manage services, and when officials make decisions. How well government entities manage and safeguard data is key to their service delivery and improving the constituent experience. Technology leaders must determine which strategy is the best for generating benefits from the cloud, mobility, analytics, and emerging technologies. That can be challenging for state and local IT organizations with limited time and budget. IIJA resources can be channeled toward critical investments in artificial intelligence (AI) and edge intelligence solutions that optimize infrastructure management, drive business process automation, close the digital divide, and increase cyber resiliency.

Enable Nationwide Broadband Access

An important impact of the IIJA has been the increased focus on nationwide broadband access. The FCC estimates that in 2021, 19 million Americans still lacked access to broadband and, in areas where broadband services are available, 100 million remained unsubscribed. The scale of broadband funding included in the IIJA is unprecedented, with over \$77 billion

allocated across 88 active programs. The new funding will be disbursed by the National Telecommunications and Information Administration (NTIA), the Federal Communications Commission (FCC), and the states, which will develop the specific rules and timeframes for each program. In addition to addressing widespread, equitable broadband access, funding will also enable a shift for faster broadband speeds. As states organize strategic broadband plans, understanding community-level needs at the intersection of broadband Access, Affordability and Adoption will be crucial to allocate these IIJA resources effectively.

- Under the \$42.45 billion [Broadband Equity, Access, and Deployment \(BEAD\) Program](#), each state will receive at least \$100 million to utilize for broadband deployment, mapping, and adoption projects and an additional amount based on the number of unserved areas to cover.
- The \$14.2 billion [Affordable Connectivity Program](#) is meant to provide discounted broadband service and connected devices to qualifying low-income households.



- The \$1 billion [Enabling Middle Mile Broadband Infrastructure Program](#) provides funding to expand and extend middle mile infrastructure to reduce the cost of connecting unserved and underserved areas to the internet backbone.

Dell Technologies believes we need to change how we approach building a 5G infrastructure, starting from the ground up. 5G is not simply an evolution of 4G; it requires massive transformation, a multi-

DELL CUSTOMER SUCCESS STORY: City of Amarillo Modernizes IT for a Data-Driven Future

The City of Amarillo's aged infrastructure was complex, costly to maintain and full of security vulnerabilities. *Highlights include:*

- Consolidated 7 storage platforms into 1
- Set up a 75-person call center in 1.5 days
- Cut first-responder response times by 80%
- Improved endpoint and data center management and security
- Saved \$800,000 in police car hardware costs

[Read more](#)

tude of additional towers and demands new distributed architectures using software-defined networks. Dell Technologies believes the model should mimic how you build a cloud; it's done with a coalition, an ecosystem, and people who understand how to build modern systems beyond just the specific needs of telecom networks. And that's where Dell Technologies and others are starting to emerge as potential facilitators to enable that collaboration and integration at scale.

Innovate with Data in Planning and Decision-Making

State and local governments produce a wealth of both structured data, like forms

and databases, and unstructured data, such as videos or emails. Agencies can harness their data assets to improve planning, decision-making and operations management, thereby enhancing their responsiveness to constituents and service delivery. Accomplishing this takes the right technology to store, manage, safeguard, and analyze that wealth of data. New Infrastructure projects will generate new data feeds and streams that can and should be safely leveraged for insights and improvements. A significant portion of the IIJA funding (\$2.75 billion) is appropriated for the purpose of digitizing government activities, increasing resident engagement, and achieving digital equity and inclusion.

- The [Digital Equity Act Programs](#) includes a total of \$2.75 billion in planning grants, capacity grants, and competitive grants that are designed to promote the meaningful adoption and use of broadband services across underserved populations including low-income households, aging populations, incarcerated individuals, veterans, individuals with disabilities, individuals with a language barrier, racial and ethnic minorities, and rural residents.

- The [Advanced Transportation Technologies and Innovation \(ATTAIN\) Program](#) provides competitive grants to deploy, install, and operate advanced transportation technologies to improve safety, mobility, efficiency, system performance, intermodal connectivity, and infrastructure return on investment.

- The [Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation \(PROTECT\) Discretionary Grants](#) cover activities that enable communities to address vulnerabilities to current and future weather events, natural disasters, and changing conditions, including sea

level rise. In addition, it covers planned transportation improvements and emergency response strategies to address those vulnerabilities.

- The [Prioritization Process Pilot Program](#) supports data-driven approaches to planning that can be evaluated for public benefit.

Enable Digital Communities and Services

City, county, and state governments are transforming their infrastructure, processes, and services to support constituents more efficiently and respond immediately to changing conditions. They gather and process edge data to manage crowds, traffic, and facilities; understand power consumption patterns and avoid supply shortages; keep residents and workers safe; and much more.

As internet service providers roll out 5G connectivity with extremely low latency and fast speeds, government agencies should think about how they can take advantage of 5G performance to enhance services, streamline data management, and serve residents more effectively. On a 5G infrastructure, it becomes possible to process and manage edge data with greater efficiency. For the many municipalities that are considering Smart City initiatives or are already in the middle of their Smart City journey, it can be challenging

to support the data volumes from systems used in traffic management, crowd control, public safety, facilities management, and other areas of operations. With a 5G foundation, that becomes significantly easier as unstructured data can be processed closer to the edge and then transmitted to dashboards and analytics engines for insights.

Worldwide, Smart Cities are expected to invest close to \$41 trillion over the next 20 years in edge data technologies. Proven, innovative solutions and practices can help governments leverage IIJA funding to deliver on the promise of digitally powered communities. The bill provides funding across several programs that will enable municipalities to purchase and integrate Internet of Things (IoT) technologies to repair and maintain critical infrastructure and advance inclusive mobility and connectivity options.

Intelligence at the Edge

Cities and States across the country have been rapidly adopting AI-powered urban management solutions like predictive and data analytics to improve their residents' civic engagement experience and increase efficiency in delivering public services. AI-enabled tools and systems are becoming an essential component of digital and physical operations management. For example, AI-enabled cameras are providing

DELL CUSTOMER SUCCESS STORY: City of Doral Builds Foundation for a Smart City

The City of Doral put a Smart City strategy in place to boost service quality, enhance the community's experience and better support residents and businesses. *Highlights include:*

- Created a new foundation for creating and evolving Smart City initiatives
- Improved security, enhancing citizen experiences
- Improved municipal services
- Attracted more diverse businesses and communities
- Obtained Smart City leadership certificate

[Read more](#)

the continuous monitoring and analytical capabilities that communities need to make more accurate and impactful decisions. AI-enabled cameras and other computer vision devices can help governments detect dangerous objects in public spaces, monitor weather-related hazards like black ice or icicle formation, or map traffic flows and congestion based on large volumes of historic and real-time data.

As governments increase their reliance on digital capabilities and security threats become more complex and frequent, the technologies used to identify, prevent, and battle them are also

evolving. To protect busy public hubs like convention centers or museums, and mission-critical facilities like airports or police precincts, state and local governments are increasingly relying on computer vision AI. By constantly capturing and processing enormous volumes of digital images and videos, computer vision enables machines to efficiently detect and flag abnormalities in any environment. This helps governments more effectively address things like changes in traffic and space utilization patterns, system malfunctions and other disruptions hindering operations, and other potential safety and security threats.

DELL CUSTOMER SUCCESS STORY: Large State Department of Transportation Modernizes Video Infrastructure

Dell partner Genetec helped a State Department of Transportation update their video infrastructure, which was only producing 90% uptime with intermittent recordings and unreliable database synchronization. *Highlights include:*

- Improved uptime from 90% to 99.9%
- Enabled ability to scale to over 100PBs in one single namespace with zero downtime
- Improved video retention infrastructure
- Simplified architecture with one centralized point of management for entire environment



Modernize IT with Greater Flexibility and Ensure the Security of Digital Assets and Systems

In many government agencies, legacy technology and disparate data sources can complicate decision-making and operations management, and they can force IT to spend the vast majority of resources on everyday operations instead of enabling digital government innovation. At the same time, technology budgets may be constrained, making it difficult for IT to invest in transformational projects.

By deploying hyperconverged, virtualized, cloud-enabled technologies to replace legacy infrastructures, IT managers can spearhead transformative change and deliver more value to residents and government entities. Because these solutions can generate measurable efficiencies and process improvements, they can help reduce costs and enable IT organizations to achieve more with limited budgets. Investing in infrastructure that relieves communities from their budgetary constraints going forward is one of the most effective uses of this transformational funding. Indeed federal infrastructure modernization and the transition to a secure environment has been the focus of the Biden Cyber Executive Order 14028 (from May 12, 2021), , which is currently under implementation.¹

In addition to receiving technical assistance and other support from state and federal agencies, IIJA includes millions of dollars in funding for hiring staff and building capacity to handle the process. Many local governments, especially those in smaller or rural communities, don't have in-house capacity to plan for the influx of IIJA funds. Most of them also lack high-end resources like a qualified cybersecurity specialist to assess and implement cybersecurity correctly. Under a few of the IIJA funding programs, localities can receive funding to hire a specialized team and create a cybersecurity program for their communities.

DELL CUSTOMER SUCCESS STORY: Dodge County Modernized Video Surveillance and Security

Dodge County, Wisconsin upgraded its video surveillance technology and storage to meet new requirements and prevent cyberattacks. *Highlights include:*

- Improved management efficiencies
- Centralized repository for video data
- Modernized to comply with retention policies
- Automated data protection and ransomware detection

[Read more](#)

¹ "Executive Order on Improving the Nation's Cybersecurity," [whitehouse.gov](https://www.whitehouse.gov), May 12, 2021 ([Link](#))

7

Getting Started

A combination of physical and digital infrastructure, along with cyber resiliency, will improve the lives of all

The Infrastructure Investment and Jobs Act is a once-in-a-generation piece of legislature. We must do the necessary preparatory work now to ensure that the funding delivers outsized positive impacts on our nation's transportation safety and sustainability goals, while ensuring that the funding is distributed equitably. Although the law is primarily focused on physical infrastructure, it also provides billions of

dollars for states and municipalities to upgrade their technology infrastructure and invest in efficient and resilient cloud-based systems that drive enduring value for community members.

Delivering these outsized positive impacts for all Americans will not happen with investments in concrete and steel alone. Digital infrastructure powered by super-power technologies – IoT, AI, 5G, and Cloud – are the vehicles of transformational change that will augment our investments in physical and digital infrastructure. Ultimately, this will help us achieve the full potential of the IIJA. The first step to accomplish this involves reconsidering our development frameworks. That is, including technology as part of our country's core infrastructure.

Although the IIJA law was passed almost a year ago, the agencies and programs tasked with distributing these funds are still at various stages of development. **To successfully realize the opportunity contained within the IIJA, state and local government leaders must work closely to position their organizations for the coming influx of federal funds.**

IIJA funds are being distributed through a combination of formula grants for states, which are determined by a set of criteria like total population and state size, and competitive grants, local governments can apply for and receive on a competitive basis. Deadlines for most 2022 competitive grants have already closed, but there



are still many agencies that are expected to award grants, contracts, and direct spending in early 2023.

To receive formula funding, each state’s Capitol must initially apply on behalf of its local governments. As part of the states’ plan, they must set up mechanisms to distribute 80 percent to local governments—including at least 25 percent to rural local governments. Once states receive the funds from federal agencies, they will be given no more than 45 days to deploy it to local governments.

“To position themselves for success, now is the time for Local, Regional, and Tribal governments to start communicating consistently with their State government around the needs and gaps they are looking to cover in their communities with IIJA funds.”

- Glen Allmendinger, President & Founder, Harbor Research

The new \$1 billion [State and Local Cybersecurity Grant Program](#) provides funding to SLTT governments to address cybersecurity risks and cybersecurity threats to their information systems. Funding can be used to implement cybersecurity projects, address imminent cybersecurity threats and prepare cybersecurity plans, which must be submitted for review to be eligible for grant funding.

Local governments should anticipate these state-level funding streams and start engaging with their state representatives around mechanisms to apply for and receive IIJA funding. Meanwhile, they should be conducting assessments and preparing plans for infrastructure projects they must prioritize—including both physical infrastructure to enable greater accessibility, and connectivity and digital infrastructure to strengthen cyber resiliency.

Most of the IIJA total funding will be allocated over a five-year period. The two main funding models included in the IIJA are:

1. Formula Funding: Congress has established formulas to distribute a portion of IIJA funds through the U.S. Department of Transportation (DOT). These formula-based grants have pre-determined allocations based on a range of demographic, economic, and other quality-of-life indicators. However, states and communities are still required to apply for these funds (with some exceptions). State-level DOTs are tasked with determining the appropriate funding distribution process in their jurisdiction and informing their communities accordingly. Examples of formula-based programs within IIJA include the [Tribal Broadband Connectivity Program](#), meant to help tribal governments develop broadband infrastructure, and the [Broadband ReConnect Program](#), a loan and grant program for broadband deployment in rural areas. [Learn more.](#)

2. Competitive Funding: When it comes to competitive grant programs, states, municipalities, and other eligible public-sector organizations must submit a competitive application to receive funding. IIJA competitive programs extend through the next ten years and are budgeted on a yearly basis. Municipalities can apply every year to obtain or renew their funding allocation. Each competitive grant program is administered by a specific federal agency, and guidelines around application requirements and deadlines vary from program to program. IIJA-funded competitive grants include the aforementioned [DHS’s State and Local Cybersecurity Grant Program](#) as well as the [Rebuilding American Infrastructure with Sustainability and Equity \(RAISE\) discretionary grants](#), the [Digital Equity Competitive Grant Program](#), [Advanced Transportation Technologies and Innovative Mobility Deployment](#), and the [“Megaprojects” Grant Program](#). [Learn more.](#)

At Dell Technologies and Intel, we believe that the true potential of physical infrastructure can only be realized when combined with innovative digital technologies, enabling the best New Infrastructure outcomes. We are committed to advancing human progress everywhere through technology. We look forward to working together to unlock the full potential of the IIJA and the once-in-a-generation opportunity it represents.



Questions?

We're here to help! From offering expert advice to solving complex problems, we've got you covered.

Contact your Sales Representative or visit Dell.com/SLG for more information.

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