



Driving Positive Changes in Public Transit with a Robust IT Infrastructure

MARKET TRENDS REPORT



Executive Summary

Public transportation took a major hit when the pandemic erupted last year. Ridership fell by 79% in 2020 compared with 2019 levels, and as of December 2020, remained about 65% below pre-pandemic levels. The government stepped in, providing much-needed funds to help offset lower revenues and enable transit agencies to buy personal protective equipment (PPE) and retrofit the system to help curb the spread of the coronavirus.

With those funds, public transit agencies have begun what will inevitably be a years-long process of rewriting the rules of transportation. For most, that means finding ways to reduce touchpoints for the entire transit process, more effectively share information with other transit agencies and the public, and reconfigure stations, subway cars and buses to better facilitate social distancing.

While the onset of COVID-19 was a direct catalyst for these changes, the situation also has prompted public transit agency officials to think more broadly about how they can provide safer, more robust, secure and economical ridership services for the long term. For many, positive permanent changes start with improving technology infrastructure beyond simply moving assets to the cloud. With a modern hybrid cloud infrastructure that puts all resources under one management umbrella, agencies will have the data and tools they need to further digitize their services to decrease touchpoints and improve communication, and collect and analyze important metrics related to ridership and scheduling.

To learn more about how public transit agencies can make the most of scarce resources, GovLoop teamed with Nutanix, whose enterprise hybrid cloud platform helps organizations make better use of the cloud, mature their digital services and improve cybersecurity.

By The Numbers

20.5%

of people who have access to public transit use it at least once per week.

28%

is the increase in public transportation ridership since 1995 in the United States.

40%

of transit agencies don't have a documented cybersecurity policy.

60%

is the average savings in total cost of ownership over five years by adopting hybrid cloud infrastructure.

25.9 minutes

is how long the average American spends traveling to work one way.

91%

of organizations are engaged in some form of digital initiative.



Transit Agencies Must Change to Survive

The Challenge: New Complexities, Old Systems

Even before the pandemic hit, public transit agencies were going through a rough patch. Ridership was down, thanks to major competition from ridesharing services. Low ridership, coupled with government shortfalls, caused many transit agencies to experience significant financial deficits. This, in turn, meant less money for important infrastructure, maintenance and modernization work, from railways to city buses.

At the same time, customer satisfaction was trending downward as riders who were used to more instant, digitized experiences in other areas of their lives wanted the same capabilities for transportation.

Transit agency officials understood that these challenges require changes, and many are well on their way toward improving them by addressing service gaps, running service outside of traditional commute hours, rerouting transportation networks to address changing priorities, providing more functional mobile apps and increasing efficiency by adding bus-only lanes and prioritizing transit signals.

When the pandemic began and ridership plunged, transit agencies that were further along than others in attacking these issues had a head start. But new, more challenging issues arose: Stations and rail cars, buses and other modes of public transit had to adhere to stringent sanitization guidelines, enforce mask guidance and ensure that fewer riders could ride together in the same compartment.

To tackle these issues effectively, public transit agencies must complete what they started. That means implementing fully touchless ridership from the moment a rider enters a rail station or bus stop to when they exit that station, along with metrics to determine how many riders should be in each compartment and how many additional rail cars or buses to add.

But in many cases, agencies have been hindered by their reliance on outmoded systems that lack the flexibility and scalability to support these changes.

The Solution: A Hybrid Cloud Infrastructure

The primary building block for achieving these goals is a hybrid cloud infrastructure (HCI) architecture, combined with a platform that aggregates all public and private cloud resources under one umbrella. Because an HCI platform is software-based, it can easily balance the amount of compute, storage and other resources required for a given situation, and can move workloads between clouds.

It comes down to reducing complexity, said Harsha Kotikela, Head of Industry Solutions for State and Local Government at Nutanix.

“Some customers may choose to buy e-tickets on their mobile devices, while others might choose to buy them on their laptop or at a kiosk,” he said. “Then take into account that there are different vendors, with different software and operating systems, on those devices. Also, different times

of the day or week when there are peaks in demand. HCI provides the performance and robustness to deal with that kind of complexity in workloads.”

With the current environment, transportation agencies will also need to be being able to see how remote work has changed ridership patterns and understand how many passengers are in each compartment at various times of day.

With this information, transit agencies can better implement safety and social distancing measures, manage routes and plan for how many subway cars or buses to run to maintain safety. These analytics also can help agencies make the best use of scarce funds. If ridership has decreased, for example, reducing the number of subway cars on a train can save money. An HCI platform provides the best infrastructure for these kinds of deep analytics.

Best Practices for Transit Modernization



Focus on agility. The traditional three-tier IT infrastructure model isn't the best option for rapidly changing requirements. Public transit agencies today must be as nimble as possible, able to respond to increasing or decreasing ridership, add services quickly and embrace new technologies like artificial intelligence, machine learning and Internet of Things (IoT). The traditional three-tier model, which consists of separate compute, storage and networking, can't support today's flexibility and scalability demands. The scale-out nature of hybrid cloud infrastructure allows transit agencies to keep pace with demands.



Be cloud smart. Most transit agencies today have a hybrid cloud model, with some workloads in private cloud and some in the public cloud. That's the right base, but it's not enough. Ensuring efficiency, performance, flexibility and scalability requires being cloud smart. That means making sure each workload is using the appropriate cloud, ensuring workloads can move back and forth between clouds as needed and being able to manage all cloud resources under one umbrella. The best way to do this, Kotikela said, is by developing a framework that clearly lays out when a workload belongs in each type of cloud, and choosing an HCI platform that gives decision-makers the visibility needed to change things as necessary.



Keep the customer front and center. Pandemic or no pandemic, customers always come first. Riders today expect the same level and speed of service and support from public transit that they get in other areas of their life. They want to be able to do everything they used to do in person or by phone via the web or mobile device, at any hour of the day. If, for example, a rider has a question about routes or the difference between different types of e-tickets, they want to be able to ask that question, perhaps by chatbot, and get an immediate answer.



Revisit your security strategy. Security used to focus mainly on the physical — turnstiles, locked doors and tamper-proof paper tickets, for example. Today, transit agencies must be concerned about security at the infrastructure, data, network and endpoint levels. Implementing virtualization is a first line of defense, providing protection at the core. Protecting endpoints can be a little trickier, requiring technology to view communication between virtual machines, analyzing potential anomalies and setting micro-segmentation policies that essentially whitelist acceptable applications. To protect the data, make sure your HCI platform uses encryption, allows for policy changes and implements write once, read many (WORM) functionality.

Case Study: BART Drives Improvements With HCI

San Francisco's Bay Area Transit System (BART) has come a long way since it opened in 1972 with 12 stations, 28 miles of tracks and a weekly ridership of about 100,000. Today, the 131-mile, 50-station system carries many times that number of passengers and intersects with countless metro stations and light rail.

To improve system performance and simplify management, system leaders started a major modernization project in 2012, modernizing all finance, HR and maintenance systems. BART then moved on to a major cloud project, implementing a Nutanix enterprise private cloud solution for all of its enterprise workloads, including mission-critical maintenance software and its work order system. The solution also powers BART's Oracle-based HR, finance and mission-critical maintenance systems and delivers on-demand compute.

Modernizing its infrastructure proved to be a fortuitous move for BART, which has gone on to use modern technology to help respond to COVID-19 throughout the system. For example, these capabilities have helped BART measure and analyze face mask covering compliance data, develop weekly [crowding charts](#) with passenger loading data detailing the average number of riders on each car of a specific train and [report on air flow](#) in train cars. During the past year, BART also has been working on standardizing touchless tickets and parking throughout the system, and expanding parking payment options through its mobile app.

HOW NUTANIX HELPS

Nutanix cloud-ready infrastructure integrates compute, storage, virtualization and networking, combined with a resilient, software-defined solution with rich machine intelligence. This hyperconverged approach spans private and public clouds, making hybrid and multi-cloud deployments easy to deploy, use and adapt.

HCI provides operational simplicity, reducing the number of component parts it takes to deploy a complete solution, and streamlines administration and management to incorporate as few interfaces as possible. It also delivers security: The Nutanix operating system and hypervisor comply with [NIST 800-53 and other standards for security hardening](#).

Finally, the platform gives transit agencies flexibility, performance and resilience. Nutanix provides linear and predictable performance for each operational workload unit, and the flexibility to mix and match node types to right-

size for specific compute and/or storage-intensive workloads. Nutanix software also is self-healing and can tolerate hardware component failures, including multiple storage drives and nodes, without impacting applications and services.

Specific components include:

- Nutanix Clusters, for connecting on-premises environments and public clouds
- Nutanix Prism, for managing the entire stack from one console
- Nutanix Beam, for identifying underutilized and unused cloud services
- Nutanix Flow, for providing visibility into the virtual network application-centric protection from network threats, malware and ransomware

For more information: www.nutanix.com/solutions/state-local

Conclusion

During the past year, public transit agencies have had a tough time. Ridership fell dramatically and revenues plummeted, despite the fact that agencies were required to put more safety measures in place. Despite the welcome passage of the [American Rescue Plan Act](#), which provides \$30.5 billion for public transportation, transit agencies have their work cut out for them.

Transit systems that have not yet embarked on a contactless ticket system are working hard to catch up. Public transit agencies also are working hard to improve customer service, efficiency, and information-sharing and collaboration with both the public and other government agencies.

Accomplishing these goals requires more digitization, more access to data, better analytics to drive good insights and more overall flexibility. Nutanix hybrid cloud platform can help public transit agencies achieve all of these goals, managing public and private cloud as one.



ABOUT NUTANIX

Nutanix is a global leader in cloud software and hyperconverged infrastructure solutions, making infrastructure invisible so that IT can focus on the applications and services that power their business. Companies around the world use Nutanix Enterprise Cloud OS software to bring one-click application management and mobility across public, private and distributed edge clouds so they can run any application at any scale with a dramatically lower total cost of ownership. The result is organizations that can rapidly deliver a high-performance IT environment on demand, giving application owners a true cloud-like experience.

For more information: <https://www.nutanix.com/solutions/state-local>



ABOUT GOVLOOP

GovLoop's mission is to "connect government to improve government." We aim to inspire public-sector professionals by serving as the knowledge network for government. GovLoop connects more than 300,000 members, fostering cross-government collaboration, solving common problems and advancing government careers. GovLoop is headquartered in Washington, D.C., with a team of dedicated professionals who share a commitment to connect and improve government.

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