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# Riverbed Solutions for the Internet of Things (IoT)

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## Simplify the way you deploy, connect, and manage your IoT infrastructure

The rise of the Internet of Things (IoT) is here. Enterprises across several industries are deploying an array of sensors, gateways, and other connected devices to gain stronger business intelligence, automate processes for improved efficiency, and open up new revenue streams.

Examples from industries experiencing transformative benefits include:

- **Energy:** Sensors send equipment performance data to centralized control systems, proactively alerting companies to maintenance needs to improve asset utilization, slash costs, and improve service delivery.
- **Manufacturing and distribution:** RFID tags track inventory in real-time, while control systems ensure suitable conditions for in-transit product, reducing supply chain bottlenecks and shipping costs.
- **Retail:** Motion sensors detect products a customer is interested in when perusing through store aisles, triggering digital displays that offer more information about the product and complementary offerings.
- **Agriculture:** Embedded sensors on farming equipment help boost the efficiency of prepping, planting, and harvesting fields, improving crop yields.

While IoT promises many compelling business outcomes, enterprise IT teams need to be wary of issues surrounding legacy infrastructure, new security risks, and increased complexity that will jeopardize many initiatives. What's needed is a software-defined platform that simplifies the process of planning, deploying and managing an edge infrastructure that delivers optimal connectivity across the IoT ecosystem, instant data availability for real-time analysis, and rigorous protection from cyber threats.

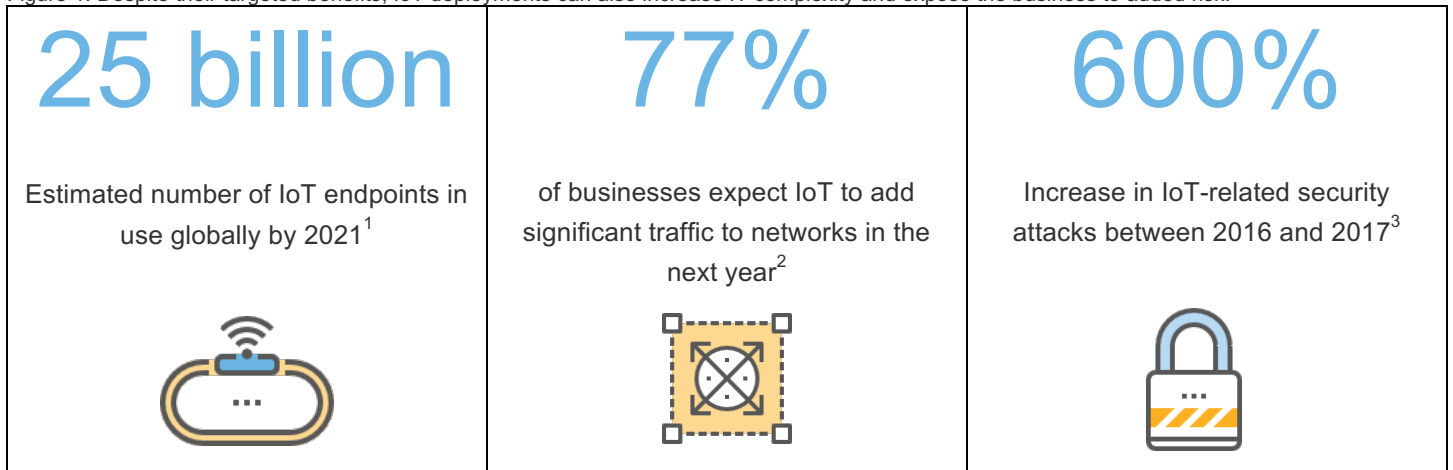
## IoT Challenges

Getting in front of the technical challenges associated with IoT is a pressing matter, as operational technology (OT) teams or lines-of-business leaders often kick-start IoT projects without IT's involvement or knowledge. Pitfalls IT leaders should anticipate include:

### **Legacy networks and management tools that weren't designed to support IoT**

IoT devices and gateways will add significant traffic to traditional MPLS networks, creating congestion and crowding out other apps and services. While broadband Internet, LTE, and other modes of transport are used to offset cost and capacity constraints, the result is an increasingly complex network that is fragile and error-prone when managed router-by-router.

Figure 1: Despite their targeted benefits, IoT deployments can also increase IT complexity and expose the business to added risk.



Secondly, while Wi-Fi is a popular choice for IoT connectivity, most Wi-Fi networks will buckle under the pressure of IoT deployments because they were designed for a limited number of users and cannot support the volume of IoT devices. This will force IT and business leaders to boost capacity by buying more access points—adding potential points of failure and more complexity. Onboarding headless IoT devices will pose another challenge, as most Wi-Fi solutions today rely on captive portals, which are web pages used to register Wi-Fi users. However, such portals are not applicable to sensors, due to their lack of web browsers or user interfaces.

#### Limited visibility into device-to-system communication

It's difficult for IT managers to map networks and ensure they stay in compliance when IoT devices are continually added to the enterprise. Discovering and documenting how these devices talk to one another and across other IT systems also becomes challenging, in part because there is an inherent lack of visibility unless IoT vendors expose their APIs. Such visibility challenges expand when the back-end of an organization's IoT deployment is the public cloud, due to the loss of control over the hosting infrastructure.

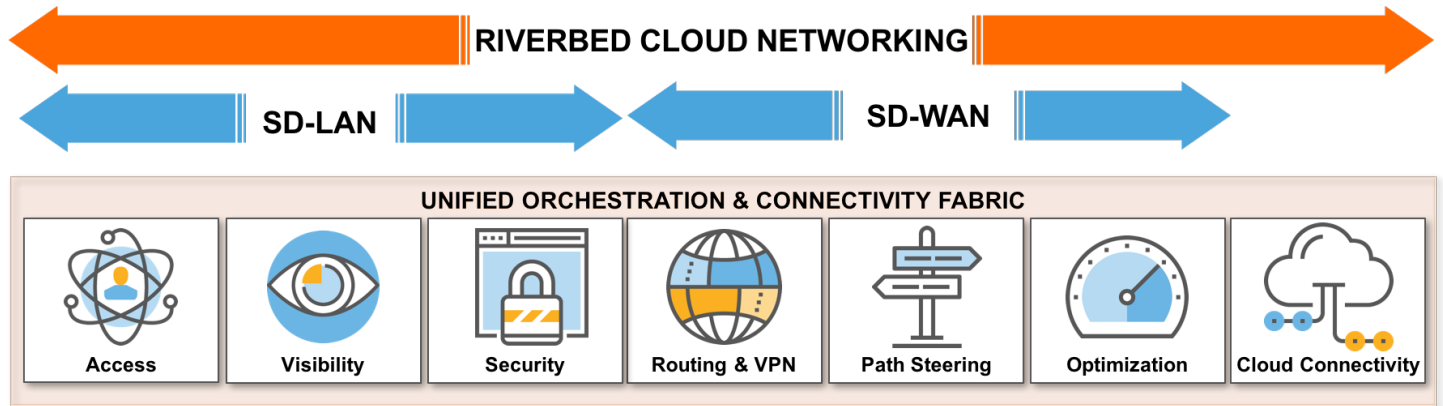
#### Managing and protecting an explosive growth of enterprise data

IoT will force businesses to provision more edge infrastructure to ingest, analyze, and store what will be an exponential growth in data at the edge. But traditional infrastructure and operations are massively inefficient from both a CapEx and OpEx perspective. Moreover, due to bandwidth limitations and latency, most IoT data remains local—where it is generated—for real-time processing and analysis. However, most IoT devices are not designed with data security in mind and, generally speaking, keeping data outside of the more secure cloud or data center means intellectual property is subject to loss or theft, increasing corporate risk.

#### Other security concerns abound

Breaches involving IoT devices have been well publicized. Because all IoT devices are connected, the attack surfaces hackers can exploit are expanding significantly. Moreover, using outdated, fragmented management tools to enforce policies across a multi-vendor, multi-transport network will lead to more security events and higher risk for the business. Lastly, IT needs to securely segment IoT traffic from other parts of the network, but doing so manually is taxing and subject to human error.

Figure 2: Riverbed provides a unified cloud networking solution that simplifies the process of building, deploying, and managing IoT-related networks.



## Solutions

Riverbed provides a software-defined platform that greatly simplifies the process of planning, deploying, and managing the IT infrastructure required to support IoT initiatives. Our solutions alleviate concerns surrounding poor network connectivity and performance, cumbersome and costly edge infrastructure, and increased security risks that often plague IoT initiatives.

### Seamless Network Connectivity and Simplified Management

IT leaders need to displace legacy, device-centric networks to ensure consistent, reliable connectivity for IoT deployments. Riverbed's Cloud Networking solution, which combines SD-WAN, WAN optimization and visibility, and cloud-enabled Wi-Fi, provides an intelligent, software-defined approach to managing networks.

#### Unified connectivity and management

With the solution, you can establish a unified network fabric that spans from wireless and wired LANs to WANs to data centers and the cloud. Through a central, cloud-based console, IT can manage the entire enterprise network—regardless of transport type—improving operational efficiency.

As IoT deployments continue to expand, IT needs a flexible network to support evolving needs. Our approach to cloud networking provides a fast and simple way of connecting new sites that have an IoT initiative.

Setting up Wi-Fi access points and SD-WAN gateways is done through a design-first, deploy-later approach that uses a unique shadow appliance concept and true zero-touch provisioning. The process of connecting IoT-enabled sites to the cloud is further simplified through one-click connectivity to leading cloud providers such as Microsoft Azure and Amazon Web Services.

#### Centralized policy orchestration and automation

Riverbed makes ongoing network administration simple through centralized, policy-based management, where network settings are written in natural business language—not in ports or IP addresses, but instead with reference to apps, locations, performance, and security. As a result, policies governing IoT access and usage are set and deployed globally within a few clicks—not thousands of lines of CLI code—giving you the agility to keep up with new demands.

#### Scalable, high-performing Wi-Fi

Understanding that Wi-Fi is key for IoT connectivity, Riverbed enables IT to handle increases in wireless traffic through one-of-a-kind, software-defined access points with high-density support. When bandwidth is constrained on a wireless LAN, Wi-Fi capacity can be boosted from the cloud to edge with a single click. Extensive insights into network usage also drive smarter decisions around future coverage and capacity needs.

To keep pace with new device demands, our onboarding workflow eliminates the need for captive portals and web browsers, making it the ideal solution for quickly and

securely connecting headless devices to the corporate Wi-Fi. We also give you the ability to oversee the health and availability of Wi-Fi connectivity for IoT devices with built-in analytics and integrated monitoring, thereby accelerating troubleshooting and root-cause analysis for device or connectivity issues.

### Agile, High-Performance Edge Computing

Businesses with IoT projects need edge computing solutions that are lean and simple, yet powerful enough to provide local-like performance while supporting future growth. Riverbed provides an extensible, software-defined Cloud Edge solution that combines cloud networking, intelligent storage caching, and high-performance compute. By physically separating compute and storage, the solution enables customers to instantly deploy and centrally manage the right set of apps, data, and network services to support the requirements of locations with IoT deployments.

Moreover, while many IoT workloads will be hosted at the edge for real-time processing, data will still need to be offloaded to the cloud for historical analysis or archiving. Some apps may remain centrally hosted altogether. That's why Riverbed provides the flexibility to run IoT apps and analyze data on a minimal edge IT footprint, while retaining the ability to quickly transmit data to centralized locations. This ensures employees across the distributed enterprise have quick, secure access to apps and data, no matter where they reside.

### Centralized deployments and operations

As companies roll-out new IoT services, they need to be able to do so in a cloud-like manner by centrally provisioning and deploying the right infrastructure in a few clicks, not by shipping, racking, and stacking on-premises equipment. With Riverbed, deploying IoT apps

is as simple as spinning up new VMs in the data center or cloud, cutting deployments from hours or days to minutes. Moreover, storage, server, and backup infrastructure is converged into a single appliance or as software running on commodity servers, eliminating the burden of managing equipment from multiple vendors.

### Instant recovery and better business continuity

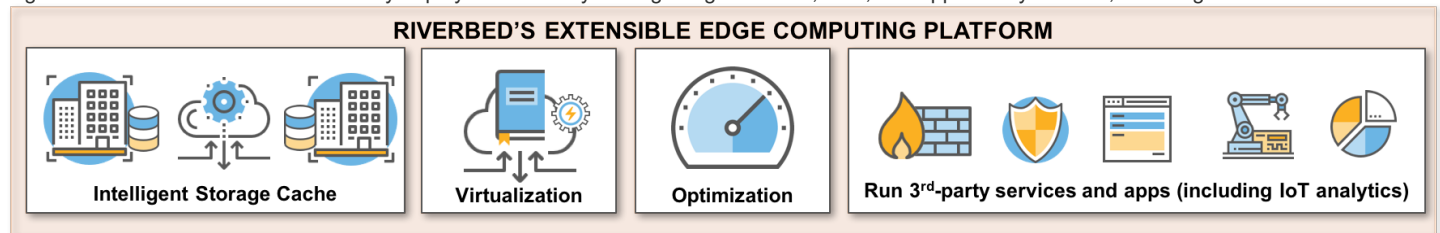
It's not enough to quickly provision new infrastructure to support IoT—recovery from downtime or site failures needs to be swift as well. Riverbed helps simplify disaster recovery practices by synchronizing IoT data to a secondary data center or cloud. During outages, designated traffic is seamlessly directed to the backup location, eliminating the need to buy separate replication solutions. And for events that require a complete site rebuild, our solution enables you to recover IoT-related apps and data in seconds with near real-time recovery time and recovery point objectives (RTO/RPO).

### Integrated network services for improved data accessibility

For workloads where IoT data is shared between business locations, Riverbed can help you accelerate data transfers that must traverse long network paths. WAN optimization frees up bandwidth and eliminates congestion, ensuring performance for both IoT and other critical apps that are in use at remote sites.

Meanwhile, dynamic path selection ensures IoT traffic is consistently steered over the best path based on established performance or security policies. For instance, in cases where the primary circuit suffers from congestion, the routing intelligence in our cloud networking technology automatically reroutes IoT traffic over a backup path to ensure operational resiliency.

Figure 3: Riverbed enables IT to instantly deploy and centrally manage edge services, data, and apps to any location, including those with IoT initiatives.



## Tighter Data and Network Security

Companies need to be able to host and analyze data at the edge without compromising security, and they also need to bolster their network perimeters without sacrificing agility. Riverbed helps organizations strike the balance between these often-competing objectives. Our solutions help you reduce risks and unwanted access by centralizing and securing all IoT data, without impacting its availability at the edge, while maintaining tighter control over your network and all connected devices.

### Complete data protection

Riverbed's intelligent storage cache minimizes data footprints by storing only the data needed by IoT applications and users at the edge. A complete copy of data is maintained securely in the data center or cloud, and any modifications to data sets are continuously synchronized back to the central storage location over optimized WAN connections.

Moreover, data is encrypted at rest and in-flight using AES 256-bit encryption with FIPS140-2 standards. And in cases where data becomes infected, such as a malware attack, our snapshot technology enables IT to instantly restore VMs to the last virus-free recovery point, further improving RPO.

### Stronger network security

Riverbed helps you isolate IoT traffic from other apps, devices, and systems using policy-driven, dynamic segmentation of Wi-Fi and WAN traffic, where security rules governing access are applied seamlessly across the network. Vulnerabilities at remote locations are

further reduced via an embedded, application-aware firewall, as well as deep integrations with security partners such as Zscaler and Palo Alto Networks.

Of course, preventing intrusion is only a part of any security posture. To that end, our solution helps monitor network usage across all locations, alerting you to potential threats stemming from unwanted access or unplanned spikes in IoT traffic.

### Tighter device management and control

Riverbed's Wi-Fi solution provides additional capabilities to ensure tighter control over IoT devices. Unique user pre-shared keys (UPSKs) enable simple, robust security for all types of headless IoT devices, which are auto-classified by type as they connect to the network. Traffic from these sensors are tagged and policies governing access are then applied at the point of connection for tighter oversight in the Wi-Fi management console.

## Learn More

Successful IoT implementations require an entire ecosystem of solutions. But as companies adopt those technologies, they must also take into consideration proper network designs, data protection schemes, and edge computing needs. Riverbed provides a platform that helps you address all three, while enabling you to better plan and manage your IoT infrastructure from the cloud—giving you an unprecedented combination of performance, agility, efficiency, and security.

To learn more, please visit:

[riverbed.com/solutions/IoT.html](https://riverbed.com/solutions/IoT.html)

### Footnotes:

1. Gartner, "2018 Strategic Roadmap for Networking," May 3, 2018
2. Shamus McGillicuddy, "Ease IoT Complexity at the Branch with SD-WAN," Feb 18, 2018
3. Symantec, "Internet Security Threat Report, " 2018

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### **About Riverbed**

Riverbed®, The Digital Performance Company™, enables organizations to maximize digital performance across every aspect of their business, allowing customers to rethink possible. Riverbed's unified and integrated Digital Performance Platform™ brings together a powerful combination of Digital Experience, Cloud Networking and Cloud Edge solutions that provides a modern IT architecture for the digital enterprise, delivering new levels of operational agility and dramatically accelerating business performance and outcomes. At more than \$1 billion in annual revenue, Riverbed's 30,000+ customers include 98% of the *Fortune* 100 and 100% of the *Forbes* Global 100. Learn more at [riverbed.com](https://riverbed.com).

The Riverbed logo consists of the word "riverbed" in a lowercase, sans-serif font. The letters are a vibrant orange color. The "i" and "e" have a small dot above them, and the "d" has a small vertical line extending from its top.