CenturyLink®

Sales

Analytics

Statistics

75%   55%   30%

130%
105%
90%
75%
60%
45%
30%
15%

30%   55%   75%   100%

56%

81%

50
40
30
20
10
0

Financial Services **eInsights:**

Go Long: Leading Financial Services Institutions Are Placing Bets—and Doubling Down on Hyperscale Computing

Executive Summary

The zero effect. Leading financial services institutions (FSIs) have pushed latency to near-zero, placing servers a cord's distance away from exchanges. For these firms, connectivity, latency, and data access are king. By investing in leading-edge technology, FSIs have ruled the market—and the world.

Now comes a new innovation, hyperscale computing, that has the power to transform the industry yet again.

In this eBook, we look at how FSIs are leveraging managed cloud services to acquire market data and seamless connectivity, free themselves from the shackles of maintaining costly infrastructures, and achieve speed-to-market for launching new platforms—and businesses. These firms are now poised to take processing power to new levels with hyperscale's in-memory capabilities.

"New applications are crucial to delivering a competitive advantage for enterprises, and hyperscale is the ideal service for these workloads," said Jared Wray, CenturyLink Cloud CTO.

Learn how market leaders and providers, including Collier Capital, IEX, PDQ ATS Inc., and Wall Street Systems are leveraging infrastructure as a service (IaaS), market data and colocation services, hosting, and more to grow and innovate their businesses.

Read on to learn why it's time to go hyperscale—today.

Table of Contents

Game of Thrones:
A Battle of Inches and Milliseconds

It's crunch time, every millisecond of every day.

Financial services leads other industries in its ability to analyze and act on voluminous amounts of data in microseconds. Companies' high-speed trading strategies depend on it.

Asset managers, investment banks, and hedge funds are the original early adopters of leading-edge technology.

They've integrated market data feeds into their trading strategies.

They've developed straight-through connections with partners.

And they've literally moved into data centers with exchanges to shave milliseconds from each trade. Colocating with exchanges is so competitive that firms measure their corded connections, to make sure a competitor doesn't have even an inch of advantage.

Brilliant quants and **sophisticated algorithms** are also key to powering these firms' successful trading strategies.

Yet it gets harder and harder to win. As a result, FSIs are taking bigger and bigger risks to drive results and outposition competitors.

In a game of thrones, where the market square is already full of kings, queens, and pretenders, how do you ascend—and maintain—the throne?
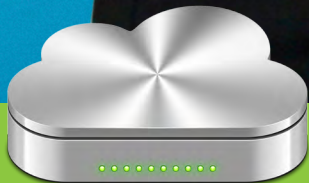
To assume the royal mantle, it's going to take a new type of power.

Hyperscale coming is here—to stay.

Hyperscale computing increases processing power to 15,000 input-output operations per second (IOPS).

Game on!

It's All Systems Go, Says Wall Street
The word from the C-suite is go fast—and faster still.

IT is the key enabler of speed-to-market, yet it can be costly and time-consuming to build, manage, and evolve powerful infrastructures—if you keep these capabilities in house.

Fortunately, cloud service providers (CSPs) have become true specialists.
Leading CSPs that serve the financial services industry offer:

PROXIMITY HOSTING

Go colo to push latencies to new lows, by placing your servers side by side with equity exchanges and dark pools, forex electronic communication networks, and alternative trading venues.

TOOLS THAT POWER THE TRADE

Access the market data, analytics, and connectivity you need to make business run at the speed of the market, from liquidity discovery to execution support with Thomson Reuters. Gobble bandwidth up to 100 Gig-E for big-data analytics, modeling, and automated business processes.

MANAGED SERVICES

From applications to infrastructures to platforms, the new catchphrase is "as a service." It's easy to order in— and manage up.

FSIs can quickly move up the chain from snacking on online software delivery to consuming global enterprise services. Security, SLAs, and compliance are bundled in, while high availability and disaster recovery are table stakes.

HYPERSCALE COMPUTING

While other industries will use hyperscale for instances, FSIs will want it for daily work. After all, analytics and modeling are part of the warp and woof of daily decision making.

There's not a (nano)second to lose.

LET'S GET STARTED.

All Hail Hyperscale

As an FSI IT leader, you know it's all about the infrastructure. Let hyperscale computing help you push processing speeds up to a billion transactions per second.[1]

Use this raw, unbridled power to:

Run the Business

ACCESS data in nanoseconds thanks to flash storage.	**AUTOMATE** risk analytics for sophisticated, multivariate scenarios.
RESPOND swiftly to market events, reducing latency for high-speed trading decisions.	**CLOSE** the books on one day's trade before starting the next.[2]

Grow the Business

BUILD, TEST, AND DEPLOY new applications faster than ever.
INTEGRATE ever-growing volumes of data via open-source technologies.

[1] "In-Memory Computing Provides Extreme Computing for Hyperscale Demands of Financial Services," July 18, 2014, *Global Banking and Finance*, Nikita Ivanov, CTO, GridGain. **http://www.globalbankingandfinance.com/in-memory-computing-provides-extreme-computing-for-hyperscale-demands-of-financial-services/**.

[2] Ibid.

Big Data, Big Business

NewVantage Partners surveyed Wall Street firms to learn about their big data initiatives.

And the results are in[3]: **96% of Wall Street firms have a big data pilot planned or in progress—and 80% have already wrapped it**.

Business **gains** include:

ANALYZING risk data in three hours versus three months.	**PERFORMING** pricing calculations in 20 minutes versus 48 hours.
ACQUIRING behavioral analytics in 20 minutes versus 72 hours.	**DRIVING** modeling automation from 150 to 15,000 models per year.

Cost **advantages** include:

DRIVING

big data technology costs down from 40K USD to 1K USD using Hadoop.

NVP
New Vantage Partners

WALL STREET JOURNAL

[3] Randy Bean, CEO and Managing Partner, NewVantage Partners, "Financial Services Companies Firms (sic) See Results from Big Data Push, CIO Journal/ Wall Street Journal, January 27, 2014, **http://blogs.wsj.com/cio/2014/01/27/financial-services-companies-firms-see-results-from-big-data-push/tab/print/**.

(Source: All data on this page from NewVantage Partners, as cited in the Wall Street Journal.)

How Leading FSIs Partner with Cloud Service Providers

Managed Cloud Services Bring High-Flying IT Advantages Down to Earth

IT Infrastructure	Market-leading Partnerships	Connectivity	Managed Cloud Services
(All of these Services)	News and Information Software Analytics Consulting	Cross-connects Real-time data Historical data Order execution Trading partners Pre- and post-trade	Hybrid Private Applications Storage Backup Security
Outsource IT capabilities Gain speed-to-market Focus on core business and IT competencies Launch new businesses Transform business and service delivery models	Power trading decisions Gain strategic insights	Fuel decision making Continually refine analytics Execute lightning-fast trades Support the entire trading process	Access best-of-breed IT capabilities Acquire rapid access to new services Reduce IT costs and increase investment leverage Develop and host key applications Leverage flash storage to store business-critical data

Who's Using CenturyLink Solutions?

14 of the TOP **14** securities **firms**

28 of the TOP **30** commercial **banks**

10 of the TOP **13** diversified **FSIs**

10 of the TOP **17** financial data **services**

Stories from the Street

Going colo: Leading FSIs and their partners leverage CenturyLink and Thomson Reuters to gain ultra-low latency to key financial exchange and access more than 200 data feeds.

Hosting: Coller Capital, a leading global investor in secondaries, uses CenturyLink's hosting and network services to ensure 24/7 access for the firm's experts and investors. The company's investments range from $1M USD to $1B USD.

"While establishing our initial subscriber base and registering the company as a broker-dealer and ATS, we also needed to find a low-latency solution that would allow us to create a larger, more efficient electronic crowd of liquidity providers."
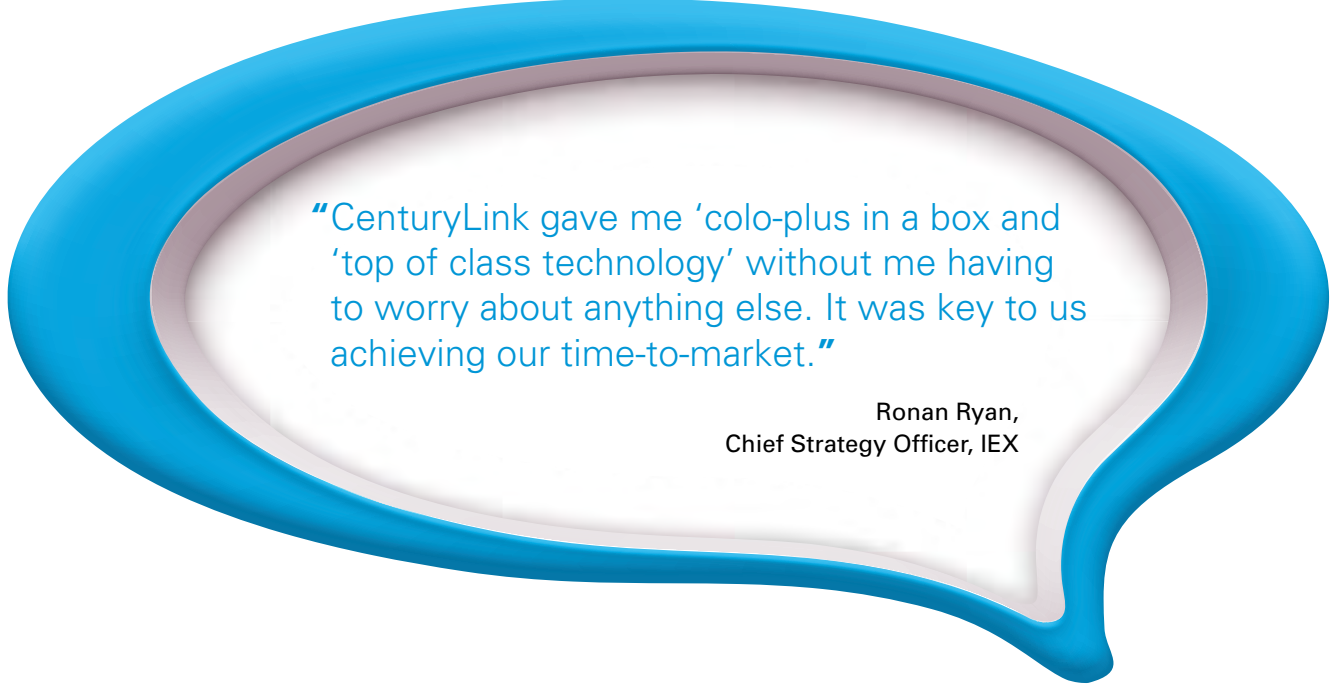
Jason Wallatch,
Managing Director, PDQ ATS, Inc.

PROCEDURE DERIVED QUOTES

Stories from the Street

Launching a new business: IEX developed an alternative trading system from scratch, enabling qualified broker dealers to gain the same access to cutting-edge technology as larger firms. The company needed to build and launch quickly, while minimizing capital expenditures.

The company partnered with CenturyLink to build its new system, leveraging its colocation, managed hosting, Internet, extranet, and consulting services.

> "CenturyLink gave me 'colo-plus in a box and 'top of class technology' without me having to worry about anything else. It was key to us achieving our time-to-market."
>
> Ronan Ryan,
> Chief Strategy Officer, IEX

iex

Stories from the Street

Transformation: Wall Street Systems, a global provider of treasury, trading, and settlement software, uses CenturyLink for all of its infrastructure, enabling it to transform its business from selling software deployed on-premises by customers to offering SaaS.

"One of CenturyLink's many strengths was its rich portfolio of managed services that spanned hosting, network, and security functionality. I don't think there's anything we don't use."

Mark Tirschwell,
Chief Technology Officer, Wall Street Systems
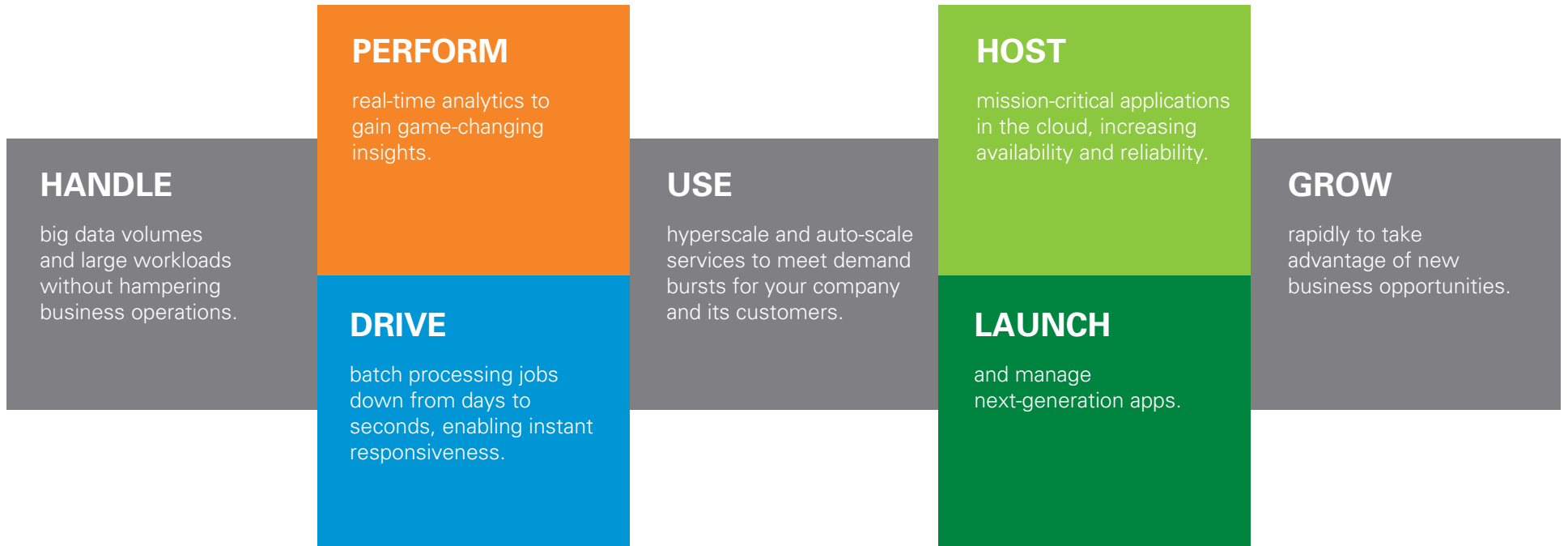
WALLSTREET
SYSTEMS

It's Go Time

Your business is moving fast. Make sure your competitors aren't moving faster.

To increase their advantage, FSIs must leverage the power of analytical tools and managed cloud services.

Hyperscale computing offers instant access to incredible raw computing power provided by tens of thousands of servers offering multi-petabytes of storage.

While Google and Facebook build and operate their own data centers, you can now get access to that same computing power from CenturyLink and Microsoft.

With Hyperscale computing, financial services firms can:

PERFORM

real-time analytics to gain game-changing insights.

HANDLE

big data volumes and large workloads without hampering business operations.

DRIVE

batch processing jobs down from days to seconds, enabling instant responsiveness.

USE

hyperscale and auto-scale services to meet demand bursts for your company and its customers.

HOST

mission-critical applications in the cloud, increasing availability and reliability.

LAUNCH

and manage next-generation apps.

GROW

rapidly to take advantage of new business opportunities.

"**CenturyLink** has been cited as a visionary market leader for cloud infrastructure in Gartner's latest magic quadrant report."

Think Big with CenturyLink Cloud

Hyperscale computing providers can provide you with the exceptional power, instant availability, and reliability you need to achieve breakthrough advantages with big data.
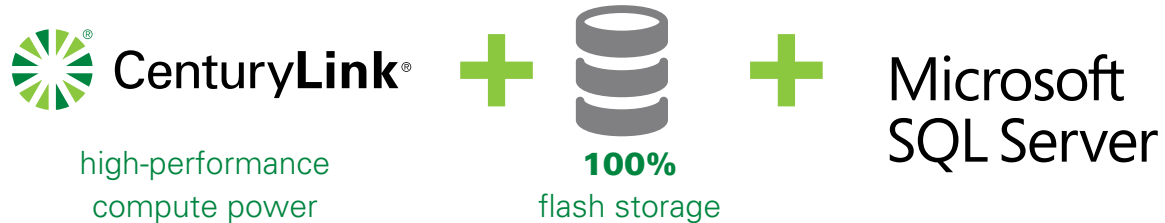
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The leading hyperscale solution = MANAGED

CenturyLink® + 100% flash storage + Microsoft SQL Server

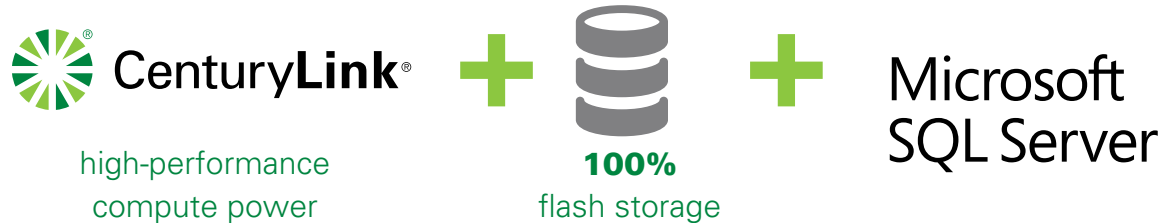high-performance
compute power

100%
flash storage

Performance equal/greater to 15,000 input/output operations per second **(IOPS)**.
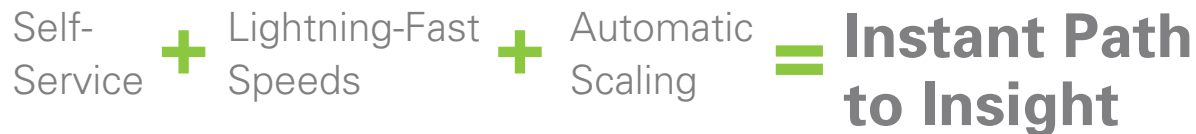
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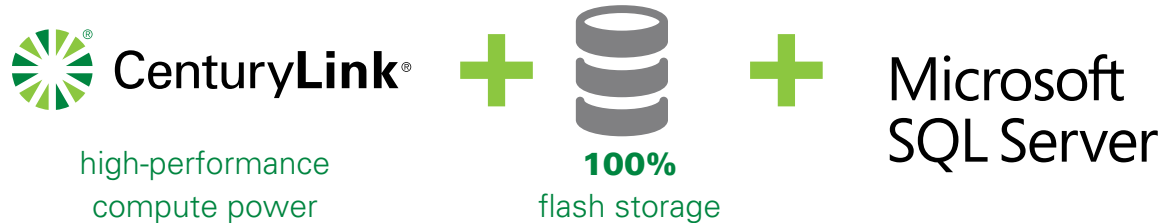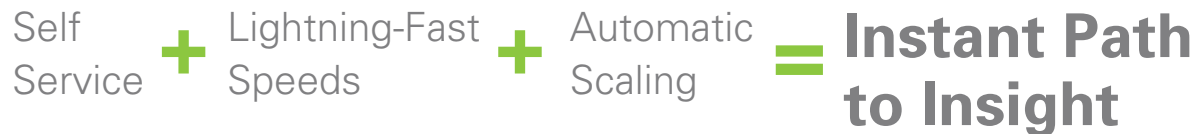
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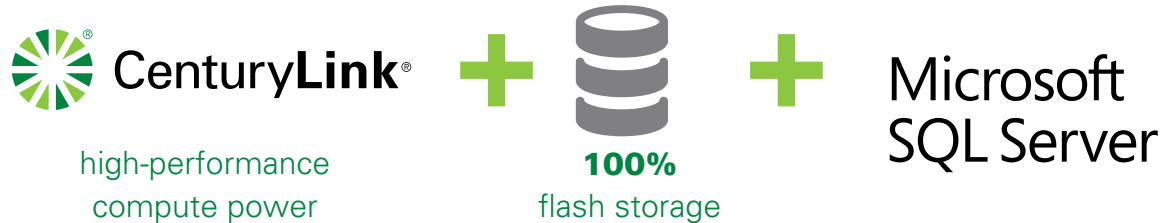Delivered from 13 global data center locations worldwide.

Ranked by **Cloud Harmony** to be among the best in the industry.
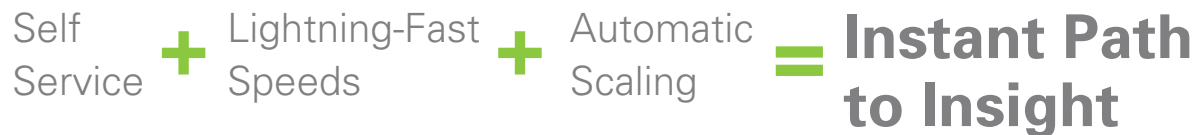
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FINANCIAL SERVICES FIRMS GAIN:

► **Exceptional** performance

► **Turnkey** FS-managed cloud services

► **Enterprise-level** security

► **Instant** availability

► **Business** flexibility

► **Security** and regulatory compliance

► **Cost-effective** solution

PERFECT FOR:

► **Web-scale** workloads

► **Big data** analytics

► **Mission-critical** applications

► **Business** systems

► **Next-generation** applications

11 Benefits for Your Business

Scale automatically to meet business demands without having to overprovision CenturyLink Managed Microsoft SQL Servers resources upfront or guess what resources you will need.

Go hyperscale by leveraging CenturyLink Cloud's high-performance compute with 100% flash storage to turbo-charge performance to at least 15,000 input-output operations per seconds (IOPS) over 10Gbps networks.

Change the game with in-memory to increase the speed of new and existing SQL Server apps, accelerate time to insights, and run important workloads faster than ever.

Maintain control using blueprints to model complex server environments and reuse them easily. Configure autoscale policies for CPUs "vertically" on a per-server basis, setting acceptable ranges and thresholds.

Quickly provision Microsoft SQL Servers into the CenturyLink Cloud directly from the CenturyLink Cloud Control portal.

Ensure continuous availability with Microsoft SQL Server 2014 AlwaysOn's functionality. Geodiverse availability groups provide built-in redundancy of your critical data.

Perform data-intensive business analytics without causing any disruption to your operations or the customer experience.

Leverage availability groups to ensure business continuity, isolate key workloads, and offload data backups, analytics, and business intelligence.

Build compliant applications on our hybrid cloud solutions. We are compliant with SSAE 16, ISAE 3402, SAS70 and ITIL and possess deep FISMA, HIPPA, and PCI experience.

Access leading security including server updates, physical security, and customer-specific data security.

Leverage top-notch hardware. Each CenturyLink Cloud node offers 70% max allocation to accommodate spikes, 100% flash storage, 10Gb networking, and limitless customization and configuration of compute, memory, storage.

About CenturyLink

CenturyLink partners with Microsoft to provide exceptional managed cloud and dedicated server services with hyperscale and auto scale capabilities. We are pleased to offer the industry-leading Microsoft SQL Server 2014 platform to our global business customer base, providing customers with AlwaysOn reliability, business intelligence, self-service tools, and a full suite of managed services.

As the third largest network carrier in the United States, we offer multisite MPLS network capabilities, significant managed cloud experience, and deep network expertise. **Our cloud services include "beyond hybrid" capabilities with standard integration between computing environments**.

They include:

PUBLIC CLOUD

Create AlwaysOn availability groups within CenturyLink Cloud, mixing traditional and hyperscale virtual machines interchangeably.

HYBRID CLOUD

Mix private and public clouds to create a hybrid data solution. Use public clouds for burst capacity, such as seasonal or unforeseen events. Remove the need for capacity planning or performance concerns with hyperscale and auto scale functionality.
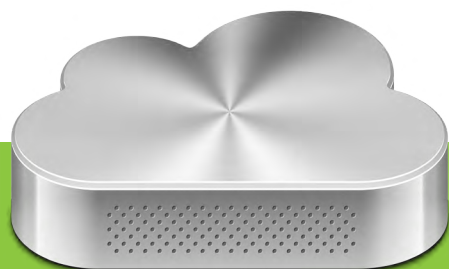
COLOCATION

CenturyLink is one of the world's largest colocation providers. Use our services to integrate your colocation environment with our public and private clouds. This is an unprecedented capability that allows you to integrate into the cloud with existing investments, mainframes, and legacy systems.

MANAGED SERVICES

Use our services to maintain, manage, and monitor your cloud servers. Access our 24x7 expertise for a flat hourly rate, ensuring your platform is always up-to-date and high functioning.

Get Extreme Performance Today!

![CenturyLink logo]

Contact CenturyLink

today to get started with hyperscale computing!

Main Phone: 1.877.388.4373

Sales: 1.866.728.8470

Website: **www.centurylinkcloud.com/hyperscale**

CenturyLink supports Microsoft® SQL Server