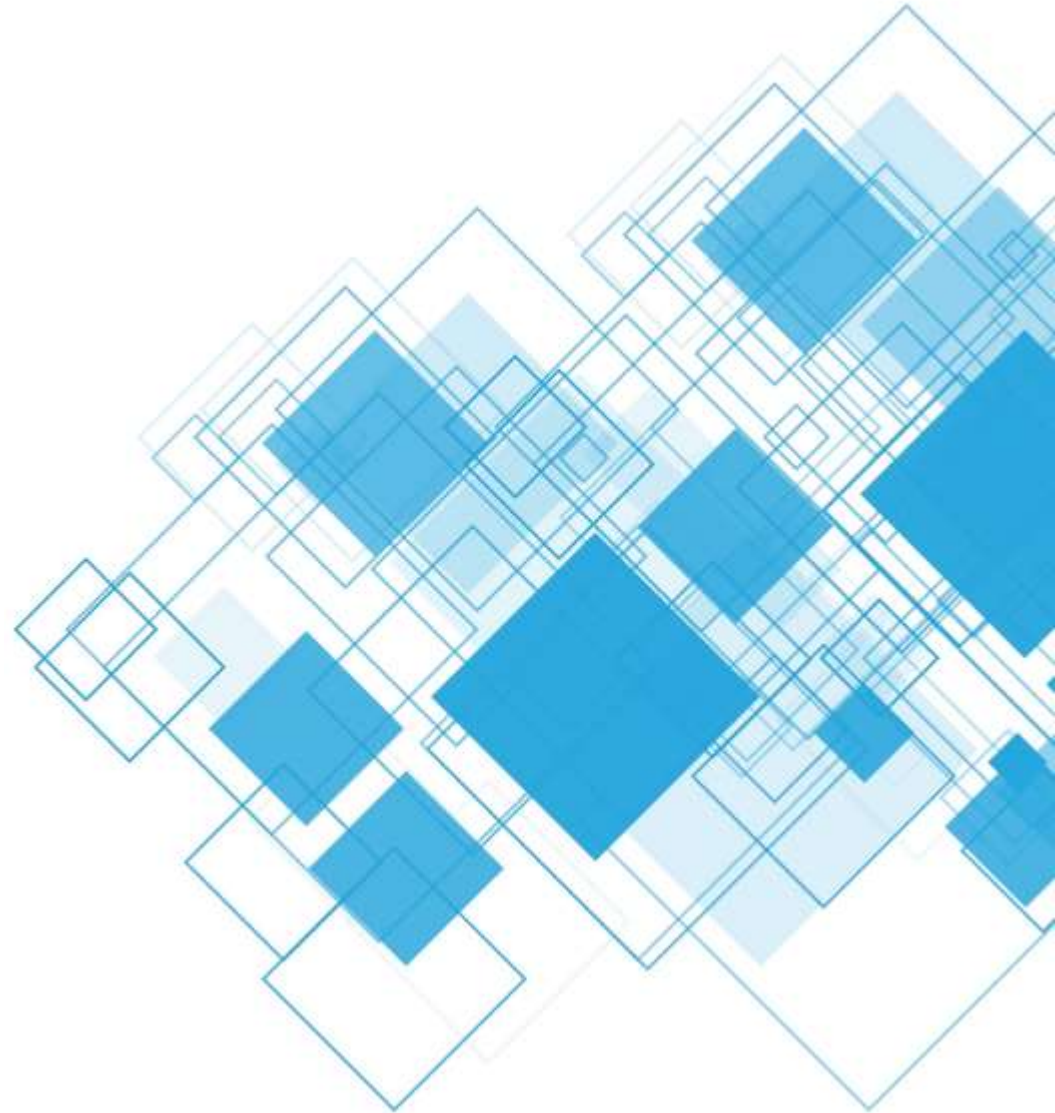


Uptime Institute[®]

Investing in safeguarding your Organisations Digital Resiliency

Ali Moinuddin Managing Director Europe



THE GLOBAL DIGITAL INFRASTRUCTURE AUTHORITY

Tier Resilience Certification

Operational Excellence, Management

Digital Resiliency

Professional Training & Development

Efficient IT, Energy & Sustainability

Network Professional Community

**Unbiased · Vendor-Neutral ·
· Digital Infrastructure & IT
expertise**

For over 20 years, Uptime Institute has offered independent, technology neutral expertise, advice & certification, working at both the executive & technical levels



A GLOBAL PERSPECTIVE

1,400
corporate
customers

Staff in 15
countries

5,000 experts
trained
globally

Global Sector
Expertise

Projects
delivered in
85 Countries



GLOBAL BEST PRACTICE

Financial Services					
Retail					
Industry					
Transport & Logistics					
Technology					

99.999>?: TODAY'S CHALLENGE: BEATING DOWNTIME

Despite Claims Downtime impacts organizations in many ways:

- Loss of Revenue
- Reputational Damage
- Reactive Engineering, focused on problem solving

UK banks [+ Add to myFT](#)

IT outage leaves UK bank customers unable to pay bills

US payments company TSYS apologises for problems that Bank

HOME | NEWS | MANUFACTURING

Power outage at Denver data center took down services at Nissan North America

Production and car dealers disrupted for days

August 22, 2019 By Peter Judge

MarketWatch Latest Watchlist Markets Investing Barron's Economy

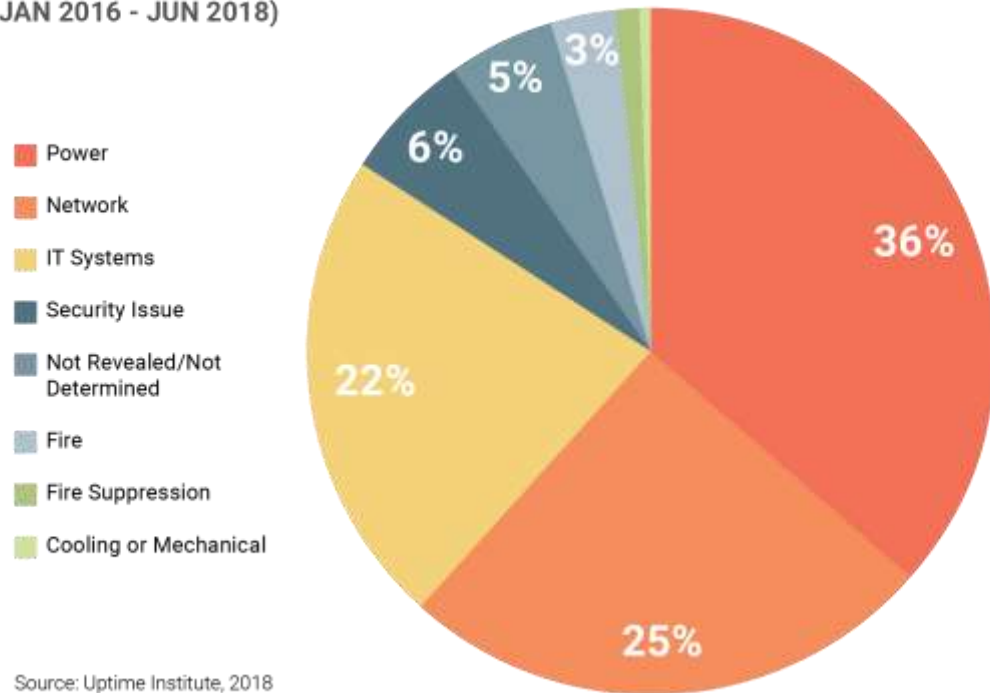
London Stock Exchange suffers worst outage in 8 years

Published: Aug 16, 2019 7:57 a.m. ET



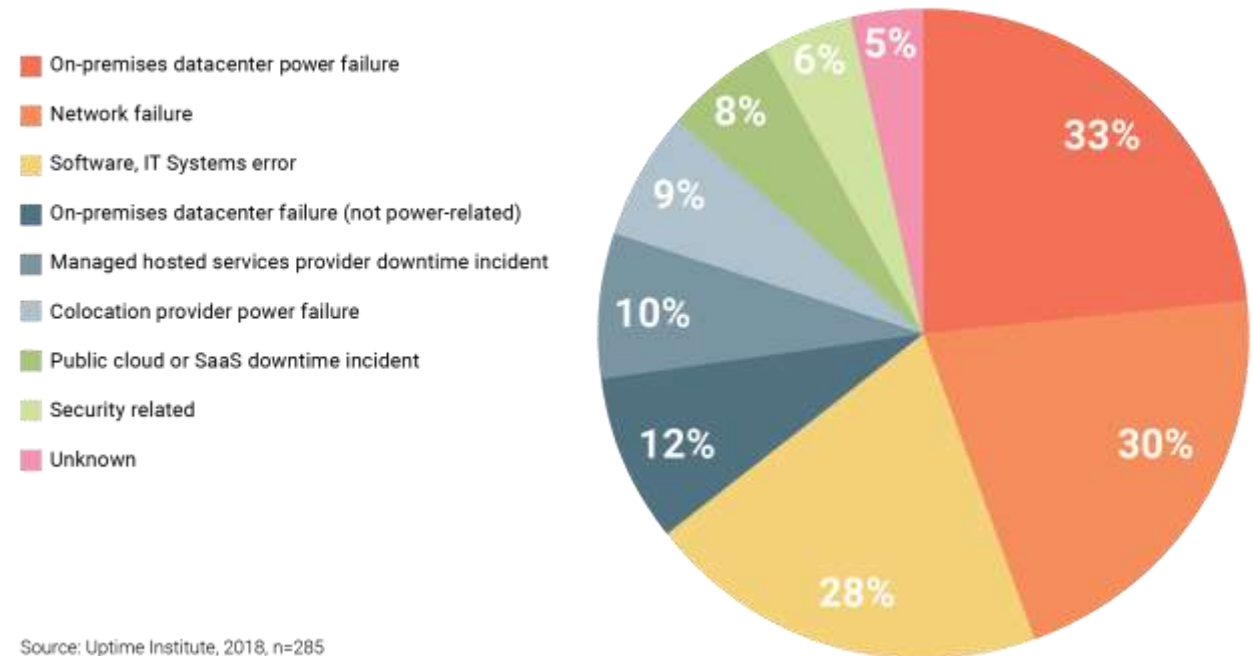
BIGGEST CAUSES OF SERVICE FAILURE

CAUSES OF 100 MAJOR PUBLIC OUTAGES
(JAN 2016 - JUN 2018)



Source: Uptime Institute, 2018

What was the primary cause[s] of your organization's largest, most recent incident or outage? Select multiple causes if required.



Source: Uptime Institute, 2018, n=285

Major public failures (Uptime Institute Research)

Primary cause of outage:

1. Power
2. Networks

Uptime Institute Research Survey 2018

Primary cause of outage:

1. Power
2. Networks

OUTAGES HAVE MORE CAUSES, WIDER EFFECTS


- Causes span across applications, data bases, networks & facilities
- Complexity & interdependencies complicate diagnosis, recovery
- Holistic approach & careful planning is required to understand vulnerabilities

Company /datacenter(s)	Date (s)	Affected areas/ extent	Cause	Cost?
Delta Airlines	August 6	All operational systems in NA.	Power surge, power/transfer switching failure; IT systems corrupted. Some servers didn't have dual power chords?	1800 flights cancelled. Quarterly earnings expected down 10%.
SW Airlines	July 20	All operational systems in NA. 12 hour outage, cancellations for several days.	Malfunctioning router triggered multiple problems (IT level).	"10s of millions of dollars"; 2,300 flights cancelled
TeleCity LDS (Equinix)	July 10			
Company /datacenter(s)	Date (s)	Affected areas/ extent	Cause	Cost?
FCA @ Fujitsu Sunnyvale CA	Sep 24-27	System for managing 50,000 FCAs.	Transformer failure?	50K financial institutions unable to access. Strategically embarrassing.
ING Bucharest	Sep 10	Banking systems	Noise from fire suppression systems damages dozens of disk drives.	Systems down for 10 hours. Many storage systems and servers replaced.
SSP at Solihull datacenter.	Aug 26 - Sep 24 (7)	All core systems.	Power outage at Solihull triggered SAN problems. Second SAN failure followed. Attempting emergency migration to Tier 3.	40% of UK insurance brokers unable to access renewal data.
Company/datacenter(s)	Date (s)	Affected areas/ extent	Cause	Cost?
AWS	Feb 28	S3 and related AWS services. US East. 100s of third party services impacted. Micro affected.	222ms high voltage drop/circuit breaker/DRUPS caused 222ms break, 200ms shutdowns. Claimed Tier 3	Not known/undisclosed
Microsoft Azure	March 15/16	Widespread (global) 26 of 28 datacenter regions affected	Azure: Power failure and Configuration error on storage.	Not known. Financial and reputational \$100m losses claimed, though unlikely.
Microsoft	March 15/16	US East, Skype, Office 365, OneDrive, Xbox and other services.	Unclear.	Mostly reputational
Microsoft Azure	March 31	Osaka DC, Japan East. Long list of MSB Services for 3-6 hrs.	Failed DRUPS led to loss of power to air handlers, overheating.	Unclear.
Teletra	Feb 1	National disruption to calls, SMS, Applications at businesses.	Fire at exchange/datacenter.	Mostly reputational.
Nebtel	March 12	Oldsmar Datacenter. US Ratings for US shows unavailable/delayed for up to three days	Power loss, back up power failure.	Mostly Reputational.
				Not known, but \$70bn advertising business in US uses Nebtel data.

Source: Uptime Institute Research, 2018

MORE CHALLENGES: COVID-19

- Remote Workforce puts strain on corporate networks
- Challenges around sharing broadband from home
- Cybersecurity implications
- Access to Data Centers
- Deferred Maintenance
- Beyond remote working:
 - More stress on payment processors

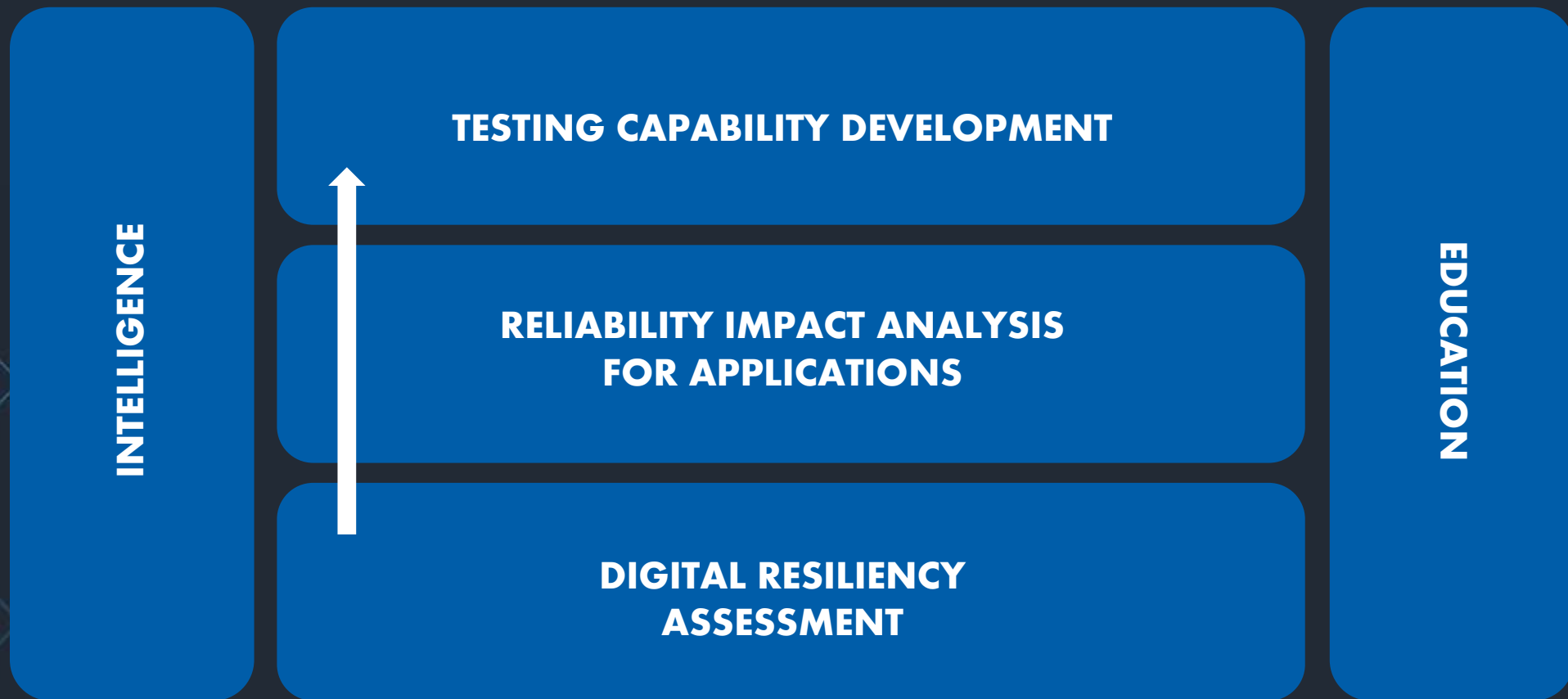


The screenshot shows the Uptime Institute website. The main content area features a webinar titled "Webinar: COVID-19 & Mission Critical Infrastructure: Update & Q&A with Uptime Institute". The page includes a navigation menu at the top with links for "Tier Certification", "Professional Services", "Education", "Events", "UI Network", "UI Intelligence", "Clients", and "Resources". A "Resources" banner is visible below the navigation. The webinar details include:

- Presentation Title:** Webinar: COVID-19 & Mission Critical Infrastructure: Update & Q&A with Uptime Institute
- Speaker:** Andy Lawrence, Executive Director of Research, Rhonda Ascierto, Vice President Research, Fred Dickerman, Senior Consultant, Chris Brown, Chief Technical Officer, Todd Traver, Vice President IT Optimization and Strategy, Amber Villegas Williamson, Consultant
- Summary:** Hear the latest on how operators and owners of mission critical infrastructure are affected by, and responding to the COVID-19 pandemic. This session will include an extended Q&A session with Uptime Institute experts, in which we respond to live questions and to some of those received over the past two weeks.

On the right side, there is a section titled "Other Recent Webinars from Uptime Institute" featuring two webinar thumbnails: "The Critical Update - 2Q 2020" and "Webinar: Reducing Infrastructure Risk: The Essential Guide to Tier Certification". The Uptime Institute logo is visible at the bottom of the page.

UPTIME INSTITUTE DIGITAL RESILIENCY FRAMEWORK



LEARN FROM YOUR PEERS: DIGITAL RESILIENCY ASSESSMENT

Developed in collaboration with fortune 100 enterprises, Cloud providers, Networking companies, Data center providers, and leading UI experts and consultants

Delivered by UI consultants with PhD level qualifications and decades of experience working across the IT infrastructure, with deep industry expertise, working with regulators



DRA OVERVIEW



- **Objective**
 - Validate an organization's service delivery to ensure maximum availability, maintainability, and reliability of all the business lines it supports
- **Approach**
 - Conduct a series of face to face workshops and interviews, as well as desk review of service documentation (architecture, processes, etc.), to evaluate the resiliency framework effectiveness across DRA's five areas
- **Scope**
 - A mission-critical Business Service

Combination of platforms required to deliver Business Services



Comprehensive platform assessment of service resiliency

BUILD A RESILIENCE SCORECARD

80 - 100% effective
 50 - 79% effective
 1 - 49% effective

- Effectiveness scored for each digital resiliency element
- Provides visibility into resiliency effectiveness
- Identifies strong and weak elements

Resiliency Area	Resiliency Element	Effectiveness
Organization, Control and Management	Corporate Policies and Priorities	50 - 79% effective
	Organizational Culture and Empowerment	80 - 100% effective
	Organizational Structure and Accountability	80 - 100% effective
	Business and Technology Requirements Alignment	80 - 100% effective
	Resiliency Risk Management program	80 - 100% effective
Applications and Data Architecture	Architectural Documentation	50 - 79% effective
	Performance targets identified and tracked	80 - 100% effective
	Critical path items required to deliver SLA	80 - 100% effective
	Fail safe mechanisms (circuit breakers, load balancer)	80 - 100% effective
	Resiliency testing regimen	80 - 100% effective
Services Platforms	Service Resilience and Fault Tolerance	80 - 100% effective
	Computational resources and services	80 - 100% effective
	Storage resources and data services	80 - 100% effective
	Communications resources and services	80 - 100% effective
	Load balancing and failover capabilities	80 - 100% effective
Network	Geographically Diverse Physical paths	50 - 79% effective
	Recovery Path	1 - 49% effective
	QoS Compliant during failover	80 - 100% effective
	Automatic Switching between Sites	80 - 100% effective
	Auto recovery from failure mode	80 - 100% effective
Data Center	Electrical system design redundancy	80 - 100% effective
	Mechanical systems design redundancy	80 - 100% effective
	Critical Distribution	80 - 100% effective
	Computer room cooling	80 - 100% effective
	Operational Maturity	80 - 100% effective

ESTABLISH: Reliability Impact Analysis for Applications

- RIMA is a unique framework for failure mode analysis, for *Digital Services*
- In a series of workshops, you will learn how to assess mission-critical applications on their SLO performance
- Works with wide-ranging sources of input, RCA, documentation, historical data and external sources and more
- Output helps drive business decisions around where to spend IT budget to improve reliability and availability
- Uptime Institute provides tool set on which to further develop

BUILD TESTING CAPABILITY

- As Businesses mature and deliver more services with expanding features, so does the need for comprehensive failure testing
- Without adequate testing capabilities in a production environment, an organization relies on incidents to discover gaps in resiliency
- Effectively turning your customers into testers
- Proactively identify failure before they become incidents Testing in Production Environment

FOUR PHASES OF DEVELOPMENT



Preparation

Identify and implement technical, organizational and knowledge capabilities required for live testing.



Non-Production Testing

Develop the ability to conduct critical dependency failure in non-production environment.



Production Testing

Introduction of failures in production environment.



Full Integration

Achieve a much higher level of automation in testing and integrate reliability testing within Continuous Integration (CI) and Delivery (CD) practices.



 two-day workshop

EDUCATE: YOUR STAFF ON RESILIENCY PRINCIPLES FOR DIGITAL INFRASTRUCTURE



- Gain a fundamental understanding of resiliency and the requirements to deliver highly available services, across the organization
- Learn the resiliency concepts and approaches available to them to build resilient applications and infrastructure
- Understand the need for application reliability scoring as a tool to decrease downtime

Summary

YOU HAVE
a structured
understanding
of critical IT
Infrastructure
used in service
delivery

YOU HAVE
Identified
operational and
infrastructure
risks based on
priorities

YOU HAVE
mult-
disciplinary
stakeholders
inputs to
**evaluation of
effectiveness**

YOU HAVE
established a
clear path for
improvement
and baseline
re-assessment

UptimeInstitute®

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WWW.UPTIMEINSTITUTE.COM
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Uptime Institute is a division of The 451 Group, a leading technology industry analyst and data company. Uptime Institute has office locations in the U.S., Mexico, Costa Rica, Brazil, U.K., Spain, U.A.E., Russia, Taiwan, Singapore, and Malaysia.

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