Not all clouds are created equal.

The performance, reliability and data protection of Intermedia's Exchange cloud show why experience and technology both matter.

INTERMEDIA
The Business Cloud™

Contact Intermedia at:

CALL US
800.379.7729

ON THE WEB
intermedia.net/NotAllClouds

Contents

When it comes to the cloud, few companies boast about technology that was born 16 years ago. But then again, few companies are underpinning their cloud with over a decade of experience.

When we say that not all clouds are created equal, this is what we mean: a cloud's performance relies as much on its provider's experience as it does on its technical assets. And while Intermedia's technology stands with the world's leaders, our experience is virtually unparalleled.

Our cloud predates "the cloud"

Everyone is talking about the cloud. And everyone seems to have a different definition of it. When we talk about our cloud, we're referring to our extremely dynamic computing platform that delivers Software as a Service to our customers. Our Exchange cloud was born in 2000, long before "cloud" was a buzzword. And from the moment of conception, it was built to prioritize performance, availability and data protection.

Today our cloud powers more exchange accounts than any provider outside of Microsoft itself. Nearly 1 million users rely on it for communication, collaboration and content management. And there are two reasons for our cloud's success: because of the best-of-breed technology that powers it, and—more importantly—because of the depth of experience that underlies its architecture.

Technology and experience meet in our cloud

Over the last 16 years, our architects and engineers have accumulated tremendous wisdom and experience as they've continuously evolved our cloud to anticipate user needs and surpass our increasingly stringent internal benchmarks.

**DATA PROTECTION
AND SECURITY**

PERFORMANCE
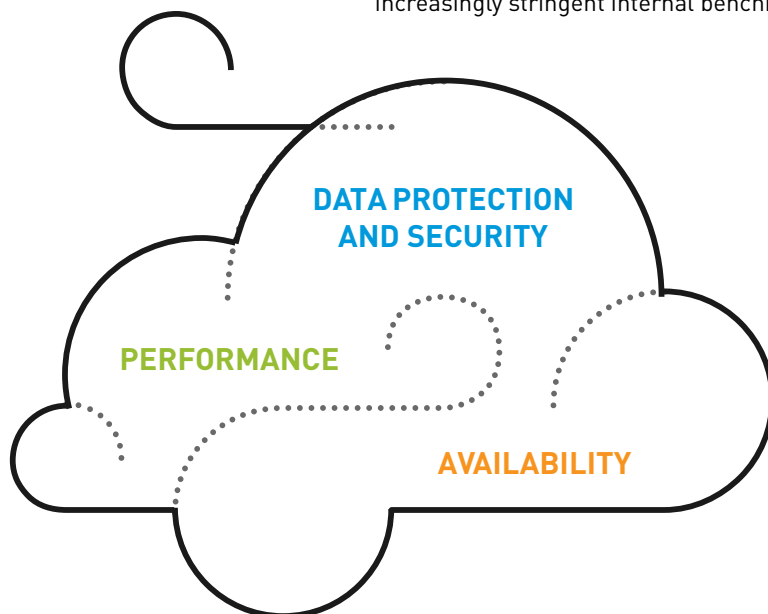
AVAILABILITY

Today, their constant pursuit of excellence coalesces around three key elements of our Exchange cloud:

• **Performance.** Our cloud minimizes network latency while maximizing processing capacity.

• **Availability.** Our cloud is purpose-built to deliver 99.999% uptime with an industry-leading, financially backed service-level agreement.

• **Data protection and security.** Our single greatest responsibility is to protect your data. This commitment permeates every aspect of our cloud and extends across our entire company.

This white paper describes the technology that underlies these three key elements of our Exchange cloud. But as you read this white paper—and as you

consider your options for a move into the cloud—remember this: when it comes to choosing the cloud provider that will become an essential partner with your business, historical experience is perhaps even more critical than raw technological specifications.

Anyone can procure hardware. But very few companies have over a decade of experience augmenting, refining and accelerating their cloud. With this experience, Intermedia stands alone.

Performance

The First Key Element of our Business Grade Cloud

For any business that relies on the cloud, speed matters.

That's why we've engineered our cloud around the two main elements that impact its performance: **network latency** and **processing capabilities**. Our architects and engineers have designed our Exchange cloud to minimize the former while maximizing the latter.

What's more, they've built **visibility and monitoring systems** so they can ensure that we meet our targets. And they've adopted **validation tools** from external sources to confirm that we maintain the fastest cloud in the industry.
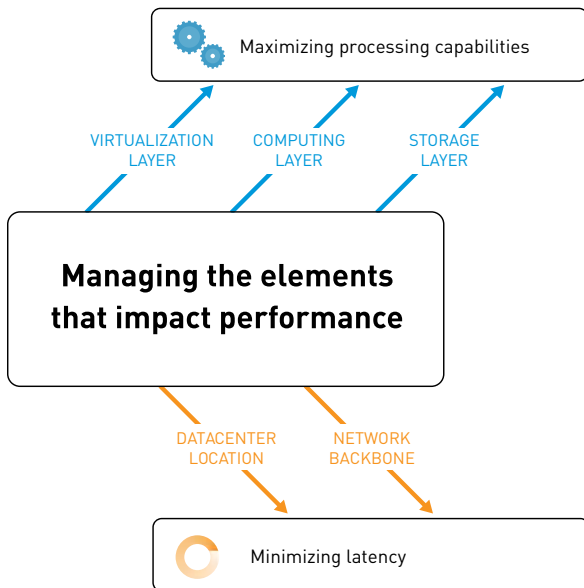
Minimizing network latency

Datacenter location. One basic cause of latency is the physical distance your data has to travel. Rather than turning to complicated WAN acceleration or complex network configuration, we simply allow our customers to select the datacenter location closest to their end users. And if your users are located in multiple geographies, you can place each user's data in the datacenter closest to them.

While this simplifies things for the customer, it was no easy task to engineer this level of control. This may be why Intermedia is the **only** major email cloud provider that allows you to choose the datacenter location that's closest to your end users.[1]

Network backbone. We connect our datacenters to the internet via multiple tier 1 internet providers like Level 3, Comcast, and Cogent. this minimizes latency by physically reducing the distance your data has to travel to reach your end users. Within our datacenters, we guarantee the highest level of network throughput and lowest latency by operating on Cisco's 10 gig nexus platform.

Managing the elements that impact performance

Maximizing processing capabilities

VIRTUALIZATION LAYER · COMPUTING LAYER · STORAGE LAYER

DATACENTER LOCATION · NETWORK BACKBONE

Minimizing latency

---

[1] Research conducted on August 13, 2012. Providers include Microsoft Office 365, Google Apps, Rackspace Hosted Exchange, SherWeb Hosted Exchange, Apptix Hosted Exchange and 123together Hosted Exchange

4

Maximizing processing capabilities

Our cloud is engineered for processing speed at all three layers of its architecture: the virtualization layer, the computing layer and the storage layer.

Virtualization layer. Many providers design their clouds for density, which means they oversubscribe virtualized resources to reduce their own costs and maximize profit. Our cloud is designed for performance, which is why we reserve resources like physical memory within our <u>VMware ESX and HyperV clusters</u>. this guarantees that application requests aren't slowed down by resource crunches.

Computing layer. The heart and soul of our server infrastructure is a blazing mix of <u>Dell PowerEdge R/M series servers</u>. These rack-mounted servers are standardized with <u>Intel E5-2620 V3 processors, 96–256 GB of RAM at 2.4Ghz</u> and dual fiber for storage access. They also have dedicated backup networks that help ensure our data security measures never cause bottlenecks in active usage.

Storage layer. For storage, our cloud also prioritizes performance over cost. We use <u>RAID10</u> for our boot volumes, transaction logs, and SQL Databases, and <u>4+1 RAID5</u> sets for our databases. We also use <u>10k drives</u> in our enterprise-class EMC and Hitachi storage arrays. (Though Microsoft recommends cheaper <u>SATA storage</u>, our engineers determined that 10k drives were the best for maximizing storage performance and reducing latency to and from the disks.) For Exchange 2016 servers, local disks within the servers hold 3 copies of customer data and use 10k SAS drives for higher performance.

What's more, our physical storage arrays do not mix workloads. our team recognized that the workloads required by services like Active Directory Domain Controllers, Skype® for Business and SharePoint are substantially different than those required exchange or SQL database servers. By keeping workloads separate, we can fine-tune each storage array to the optimal state based on its specific workload characteristics and make our cloud perform that much more responsively.

Infrastructure visibility

The only way to ensure superior performance is by having full visibility into it—not just from inside the datacenter, but also from outside perspectives that replicate the end user experience.

Visibility tools. Over our 16-year history, we have developed powerful proprietary monitoring services. and we combine them with VMTurbo and management products based on VMware, Microsoft and Linux. Together, these tools let us examine our processing speed and network latency from every possible angle. We can predict failure and performance bottlenecks to accurately monitor our services from the customer perspective, and work proactively to ensure any issues are imperceptible to end users.

Availability

The Second Key Element of our Business Grade Cloud

Our engineers and architects view the pursuit of 100% uptime as a passion. For the past twelve years, they have continuously analyzed historical operational experience to unearth insights for maintaining future performance. Today, our business-grade cloud delivers 99.999% uptime and includes a financially backed, industry-leading service-level agreement.

This level of availability is possible only because our Microsoft Certified architects and engineers have applied their deep expertise to three key technological components: our **architecture**, our world-class **datacenters**, and the **Internet providers** that connect our datacenters to the world.

The three keys to our availability

OUR ARCHITECTURE

OUR PROVIDERS

OUR DATACENTERS

Architecture

In 2009, Intermedia became the world's first provider of hosted Microsoft Exchange 2010. While preparing for that launch, our team decided to use this milestone to re-architect our cloud from the ground up. Our engineers and architects gathered to envision the perfect cloud platform—one that maximized both performance **and** availability—and they devised an original architecture that we call our Multi-Zone Design.

The Multi-Zone Design is one of intermedia's pinnacle achievements. In this architecture, each section is built on its own dedicated hardware and its own VMware cluster. This design ensures that any infrastructure failures are isolated to a specific section of the cloud to guarantee service availability.

As the diagrams on the next couple of pages show, each segment is configured slightly differently. And as you'll read, that configuration is very deliberate.

Supporting each segment are F5 BigIP LTM load balancers, Cisco firewall service modules, Cisco Nexus 10G switches, Dell PowerEdge R/M series servers, and EMC and Hitachi 10k storage.

Our Exchange mailbox databases are backed up using our proprietary Dumpster Restore Tool. To ensure highest possible hardware availability, each front-end section leverages VMware vMotion capabilities across cluster nodes within each quadrant. The back end sections use database replication for redundancy.

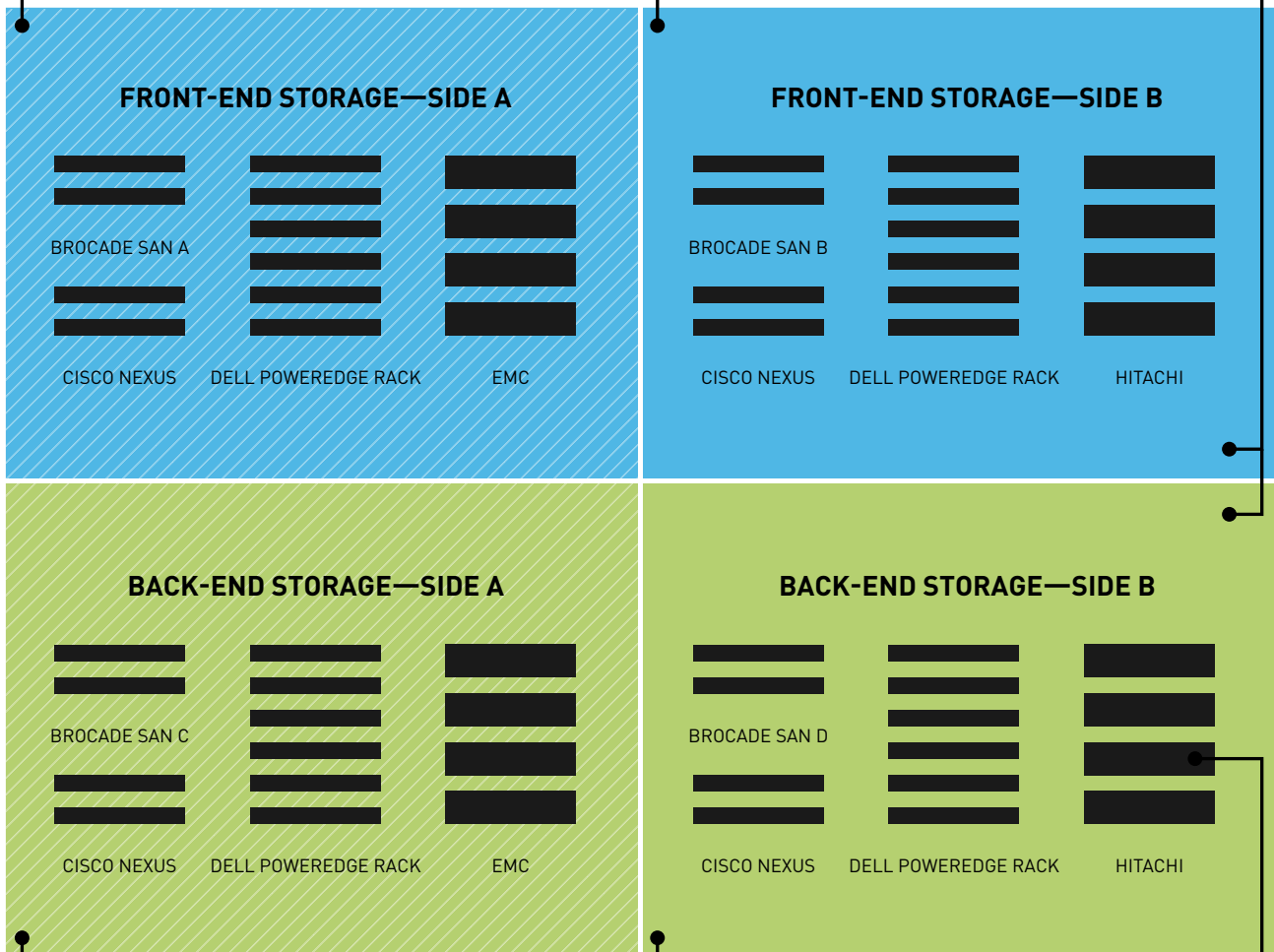**Multi-zone enterprise cloud platform for dedicated deployments**

Front-end quadrants

This quadrant is reserved for front-end servers that are typically used in active/active configuration (Active Directory, SharePoint, Skype® for Business, etc).

Built in a redundancy model referred to as Nx2 Capacity Model, each front-end quadrant has dedicated storage arrays, storage fabrics, switches and backup network.

Physical separation

Each quadrant is physically separate. This reserves twice the needed capacity to sustain a failure of up to half our infrastructure. This also means that in the rare event of an unexplained load or capacity demands, we are well protected.

FRONT-END STORAGE—SIDE A

BROCADE SAN A

CISCO NEXUS   DELL POWEREDGE RACK   EMC

FRONT-END STORAGE—SIDE B

BROCADE SAN B

CISCO NEXUS   DELL POWEREDGE RACK   HITACHI

BACK-END STORAGE—SIDE A

BROCADE SAN C

CISCO NEXUS   DELL POWEREDGE RACK   EMC

BACK-END STORAGE—SIDE B

BROCADE SAN D

CISCO NEXUS   DELL POWEREDGE RACK   HITACHI

Back-end quadrants

This quadrant is configured in a Database Availability Group, with all our active databases running in one corner and all passive databases on the opposite.

These two database quadrant corners also have their own dedicated storage arrays, storage fabrics, switches, servers and backup network.

Continuous backups

We take daily snapshots of mailbox data using our proprietary Dumpster Restore Tool. Using this snapshot, we can restore folder hierarchy when restoring items utilizing Single Item Recovery.
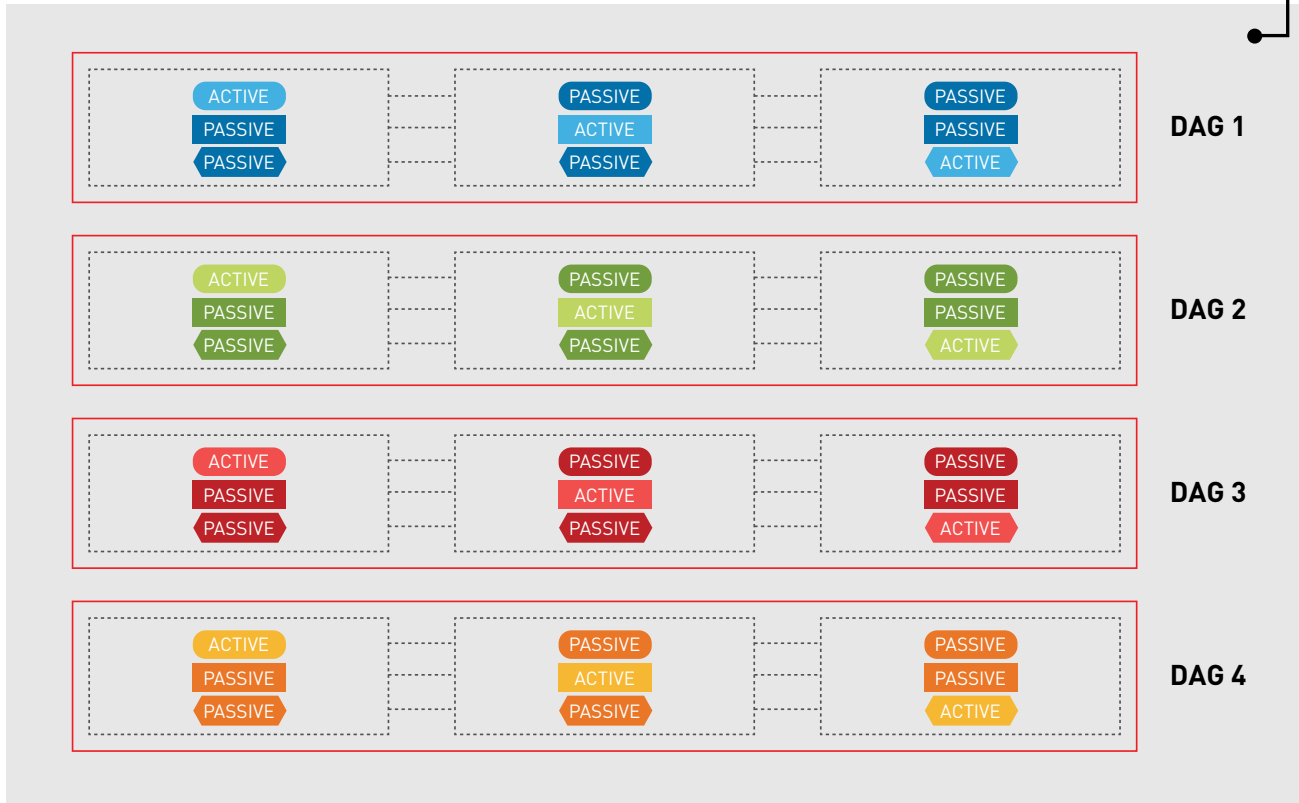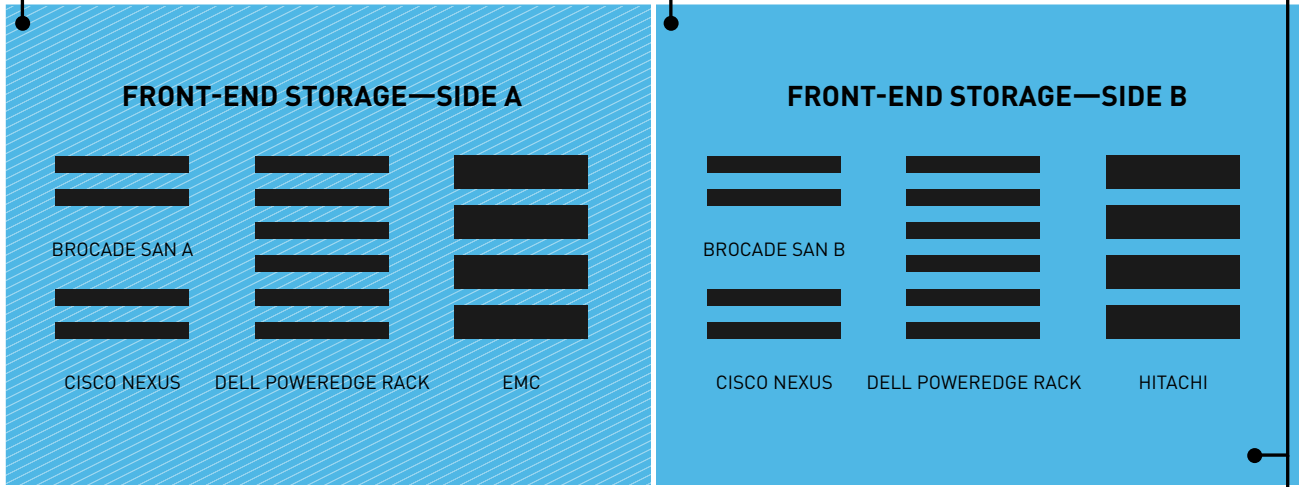
7

Multi-zone enterprise cloud platform for managed-public deployments

Front-end quadrants

This quadrant is reserved for front-end servers that are typically used in active/active configuration (Active Directory, SharePoint, Skype for Business, etc).

Built in a redundancy model referred to as Nx2 Capacity Model, each front-end quadrant has dedicated storage arrays, storage fabrics, switches and backup network.

Physical separation

Each quadrant is physically separate. This reserves twice the needed capacity to sustain a failure of up to half our infrastructure. This also means that in the rare event of an unexplained load or capacity demands, we are well protected.

FRONT-END STORAGE—SIDE A

BROCADE SAN A

CISCO NEXUS   DELL POWEREDGE RACK   EMC

FRONT-END STORAGE—SIDE B

BROCADE SAN B

CISCO NEXUS   DELL POWEREDGE RACK   HITACHI

			DAG 1
ACTIVE / PASSIVE / PASSIVE	PASSIVE / ACTIVE / PASSIVE	PASSIVE / PASSIVE / ACTIVE	

			DAG 2
ACTIVE / PASSIVE / PASSIVE	PASSIVE / ACTIVE / PASSIVE	PASSIVE / PASSIVE / ACTIVE	

			DAG 3
ACTIVE / PASSIVE / PASSIVE	PASSIVE / ACTIVE / PASSIVE	PASSIVE / PASSIVE / ACTIVE	

			DAG 4
ACTIVE / PASSIVE / PASSIVE	PASSIVE / ACTIVE / PASSIVE	PASSIVE / PASSIVE / ACTIVE	

Back-end

This section is configured in a series of Database Availability Groups, with databases dispersed over multiple servers to allow for redundant copies – 1 active and 2 passive. DAGs are powered by Dell PowerEdge R730s backed by 10k SAS hard drives.

Datacenters

Each of our datacenters has been chosen to meet the highest availability criteria. Each one is SSAE 16 Type II compliant. Each one has verified levels of physical security. Each one also possesses redundant electrical and cooling infrastructure, including diesel generators for backup power, to protect against all imaginable problems. And finally, our entire cloud infrastructure is deployed with redundant power supply units in the unlikely event of a power feed failure.
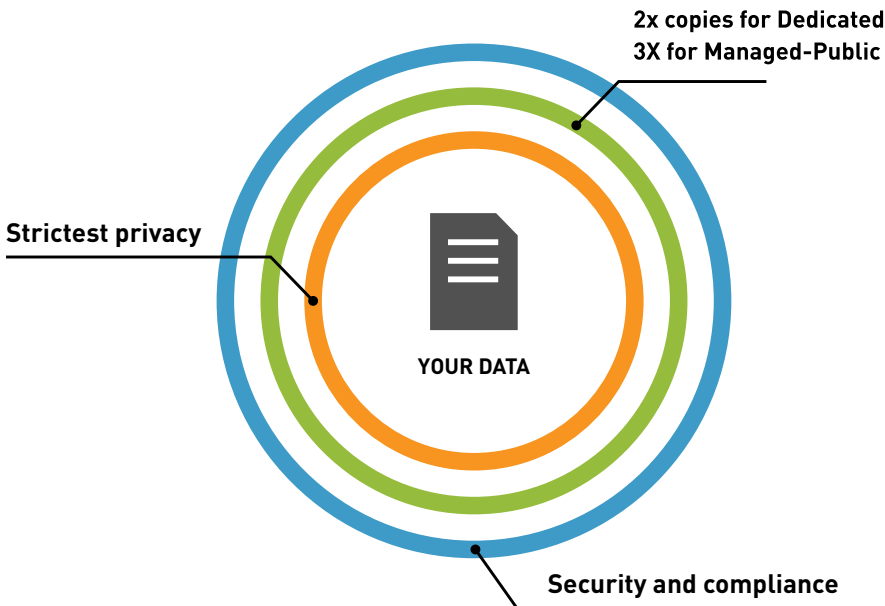
Internet providers

The final element of our high availability comprises the providers that connect our datacenters to the Internet. We've chosen multiple Tier 1 Internet providers for this purpose, including Sprint, Level 3 and Verizon. Taken together, these providers guarantee availability and give us capabilities to route traffic around any provider backbone issues that may arise. Our goal is simple: your data and tools are always available.

Data Protection, Security and Privacy

THE THIRD KEY ELEMENT OF OUR BUSINESS GRADE CLOUD

We believe that our greatest responsibility is to protect your data.

**2x copies for Dedicated
3X for Managed-Public**

Strictest privacy

YOUR DATA

Security and compliance

We also believe that, because it's your data, you have the right to know where it resides. In addition to minimizing latency, that's why we let you select which datacenter will protect your end user data: it provides the peace of mind that comes from knowing where your data is physically stored.

Your data is also well-protected. Our Multi-Zone Design protects against data corruption and possible data loss due to hardware failure. We leverage Microsoft Database availability groups with real-time replication between segments. Our infrastructure is designed to replicate data multiple times within one datacenter as well as on remote backup. Beyond that, we adhere to proven security and compliance practices and implement a strict privacy policy.

Data protection

As we said, Intermedia maintains at least two copies of your data. These copies reside on physical disks in separate corners of the database quadrants, ensuring service availability in the event that one of our EMC or Hitachi units experiences a failure.

In our experience, data corruption is the largest threat to data integrity and availability. Our design makes it highly unlikely that corrupt data will replicate from one copy to another. This means that you will always have a good production copy of your data on at least one of our database quadrants.

Security standards

Intermedia's commitment to the security and privacy is of paramount importance. as the world's largest provider of hosted exchange mailbox services, security is in our DNA—and it has been for over 16 years.

To protect our customers' data, we have implemented security controls, processes and technologies that far exceed what most businesses could reasonably build on their own. We also follow national and international security standards and best practices.

Third-party audits

Intermedia has a SOC 2 audit report from an independent auditor who has validated that, in their opinion, our controls and processes were effective in assuring security during the evaluation period. Intermedia is audited against all five trust service principles (security, availability, processing integrity, confidentiality and privacy).

Dedicated security team

Intermedia employs a team of dedicated and certified information security experts who are focused on protecting your data every single day. They manage all aspects of security, including:

• Log correlation and event monitoring

• Incident response

• Managing intrusion detection systems (both host and network)

• Perimeter defense

• Service and architecture testing

• Source code reviews

• Vulnerability Management

Network security

Intermedia's datacenters are audited to the SSAE 16 Type II standard, which validates the provider's commitment to the trust principles of security, availability, processing integrity, confidentiality, and privacy.

Our networks are protected in a number of critical ways:

• Multiple redundant, enterprise-class firewall systems

• Multiple redundant carrier grade intrusion protection systems (IPS)

• Network access control

• All Intermedia services are protected by 24x7x365 DDoS mitigation services from a leading provider

System security

To ensure system security, we adhere to the following practices:

• Threat intelligence

• Vulnerability management

• Patch management

• Network and application penetration testing

• Code reviews (automated and manual)

• Network forensics

• Incident response

Privacy policy

Intermedia offers a clearly documented privacy policy. It guarantees that we will not access or use your data in any way, except when we have your permission to troubleshoot an issue. Intermedia is certified Safe Harbor compliant with the U.S. Department of Commerce.

To read Intermedia's Privacy Policy, please visit http://www.intermedia.net/legal/PrivacyPolicy.pdf

Conclusion

As you consider your options for the cloud, remember the value of experience. It's not just about technology, it's about how technology is implemented. and implementation is wholly a function of experience.

Not all clouds are created equal. Intermedia's cloud is born out of 16 years of experience with a relentless focus on performance, availability and data protection. our exchange cloud is at the top of the industry today—and our engineers and architects are working to keep it that way long into the future.

As you consider the cloud to support your business infrastructure, consider the experience that underpins it.

INTERMEDIA
The Business Cloud™

Contact Intermedia at:

CALL US
800.379.7729

ON THE WEB
intermedia.net/NotAllClouds