



SIOS

Safeguarding SAP HANA: Key Strategies for Ensuring High Availability & Disaster Recovery

Todd Doane
Solutions Architect



Introduction

Todd Doane
Solutions Architect



- **30+ Years Experience**
Designing and
Implementing HA Solutions
- **1 Years with SIOS**
Solutions Architect

SIOS Technology

- 20+ Years focused on HA/DR
- Award-winning PS and Support
- SAP-Certified Products
- SIOS Protection Suite for S/4HANA HA and NetWeaver HA
- Microsoft Partner Since 2007
- AWS Partner Since 2014
- Worldwide Locations: US, UK, Germany, Singapore, Japan



SAP® Certified
Integration with SAP S/4HANA®

SAP® Certified
Integration with SAP NetWeaver®



ORACLE

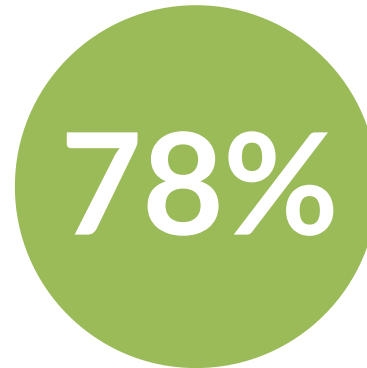




SAP HANA



SAP Mandated migration to SAP HANA by 2027



78% of US-based SAP customers are using or planning to use S/4HANA (89% in UK & Ireland)¹



The average deployment time for SAP S/4HANA is around 18 months.²

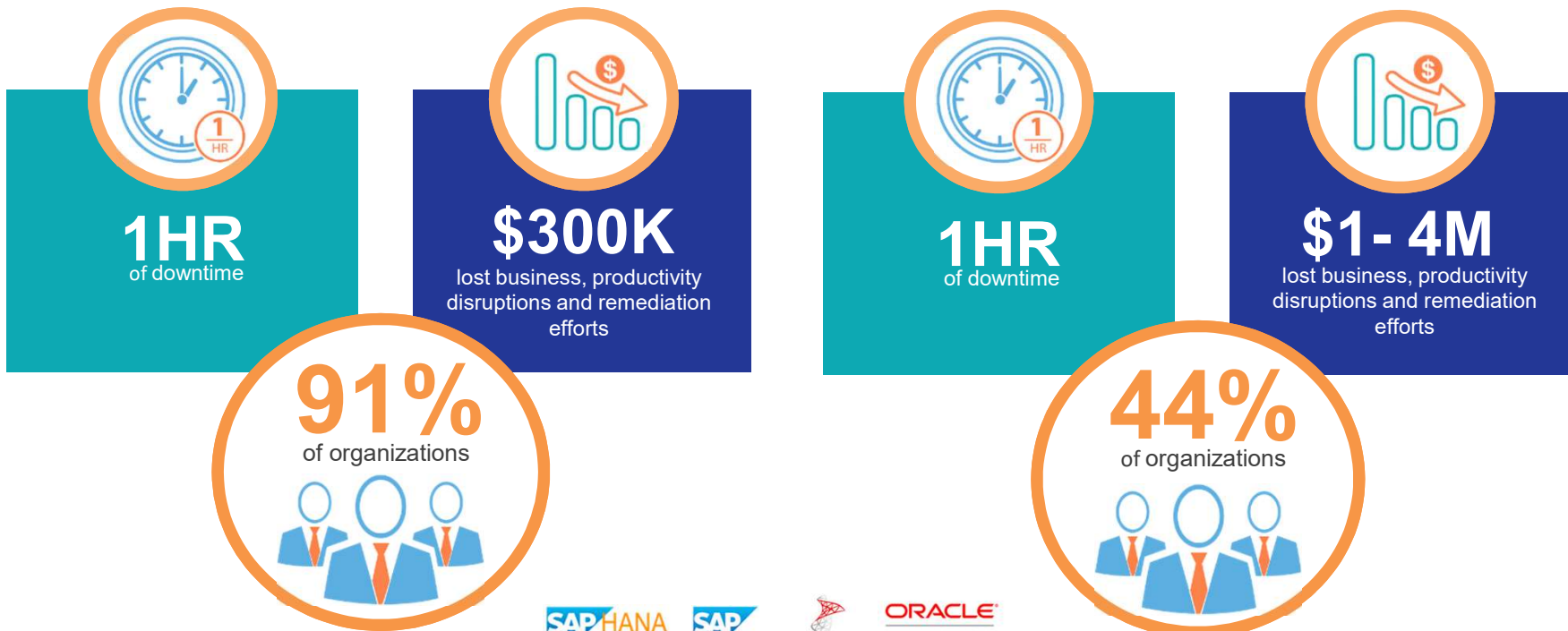


¹[https://www.cio.com/article/416188/sap-user-groups-see-pick-up-in-migration-to-s-4hana.html#:~:text=In%20the%20US%2C%20the%20proportion,Users'%20Group%20\(ASUG\).,Syntax & ASUG Survey: Trading up to the Cloud Leaves Competitors in the Dust](https://www.cio.com/article/416188/sap-user-groups-see-pick-up-in-migration-to-s-4hana.html#:~:text=In%20the%20US%2C%20the%20proportion,Users'%20Group%20(ASUG).,Syntax & ASUG Survey: Trading up to the Cloud Leaves Competitors in the Dust)

²SAPInsider: <https://sapinsider.org/analyst-insights/is-sap-s4hana-adoption-accelerating/>



Downtime for SAP and HANA is expensive



Data courtesy of ITIC 2021 Global Server Hardware, Server OS Reliability Survey





Identifying Failure Scenarios

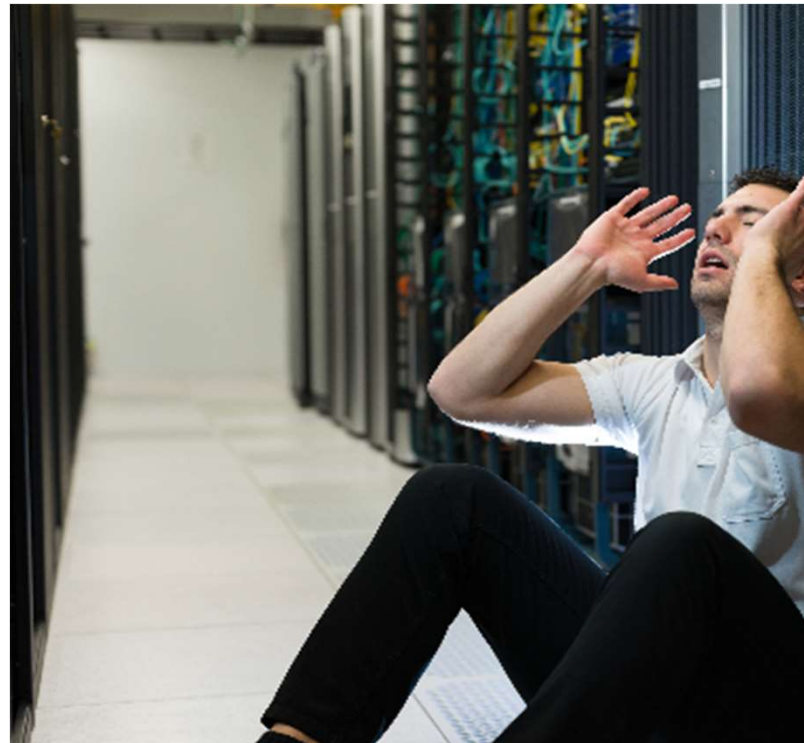


According to Quorum



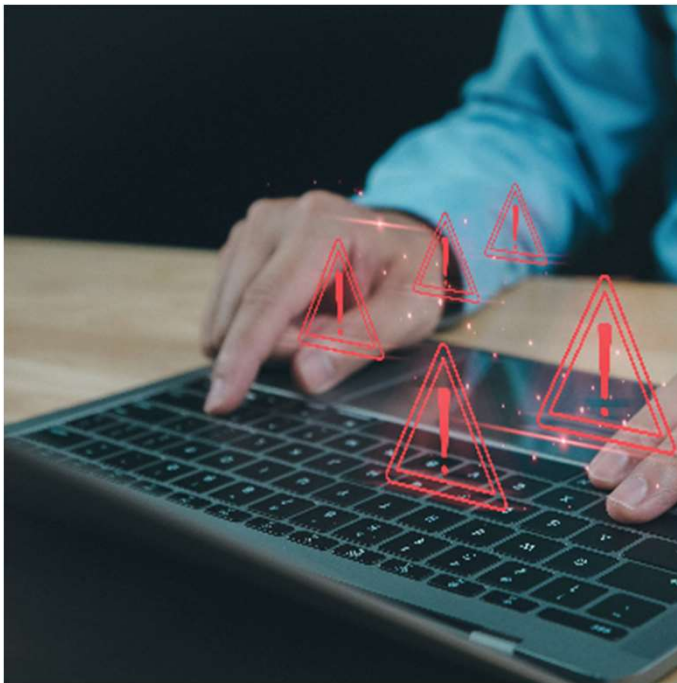
Hardware Failures

- Compute
- Storage
- Memory
- Network





Software Failures



- Databases
- APIs
- Operating Systems
- Abstraction layer
- Presentation layer
- Messaging





Environmental



- Earthquake
- Wild Fire
- Avalanche
- Cold Wave
- Heat Wave
- Hurricane
- Landslide
- Tornado
- Typhoon
- Tsunami
- Flood
- High Winds
- Volcano





Human



- Hackers
- Mistakes
- Negligence
- Neglect
- Incompetence
- Ignorance





Downtime Takes a Toll on IT Teams



- **Costly Disruption**
 - Drop current tasks to respond
 - Identify root cause of problem and solution
 - Stressed-induced errors
- **Expertise needed**
 - Staff shortage
 - Changing role
- **Highly Manual**
 - Monitoring to ensure applications are “healthy”
 - Clustering/DR scripting and management
- **Cloud challenges**
 - Added complexity
 - Less control
 - No way to do realistic DR testing





HA/DR Needs are Often Unclear

- Cloud-native resiliency and scalability are ideal for **stateless** but not for **stateful** applications
- **Stateful** design of SAP is best Protected by **data replication** and **failover clustering**
- **Clustering** is best for cloud, on-prem and hybrid





HA/DR Protection is a Necessity

Cloud Outages

Uncommon but Costly

“Amazon Web Services explains outage and will make it easier to track future ones”- [CNBC](#)

“Global Azure outage knocked out virtual machines, other VM-dependent services”- [ZDnet](#)

“Google Cloud Outage Takes Major Websites & Apps Down”- [CRN](#)

Disasters

Sitewide and Regional

“COVID-19 upended technology priorities. Where do businesses go from here?”
- [CIODive Magazine](#)

“Storm Damage Closes LA Technology Building”
- [Lincoln Cty News](#)

“Huge customer effort keeps flooded NYC data center running”- [Lincoln ComputerWorld](#)

Human Error

Sitewide and Regional

“How A ‘Human Error’ Took Down Servers of Europe's Major Cloud Computing Group” - [NDTV](#)

“Human Error To Blame in AWS Outage” - [Website Mag](#)

“Study Shows Human Error To Blame In Majority Of Network Downtime Incidents” - [Appneta](#)



Criteria for HA/DR for SAP HANA



Automatic Recovery

Constant workload monitoring and the ability to **restore operation** when services are compromised.



Designed for HA and DR

Redundant workloads across cloud fault domains for HA and **across cloud regions** or on **prem geo** for DR



Regular Recovery Testing

All workload recovery processes (automated and manual) **thoroughly tested** as realistically possible as part of normal production processes.



But Delivering HA/DR is Challenging





Many HA Solutions are . . .



**Complex &
manual**



**Notoriously
unreliable
& unstable**



**Costly & time
consuming to
keep up with
changes**





Vendor Lock-in





What's the Solution?





Three Key Requirements

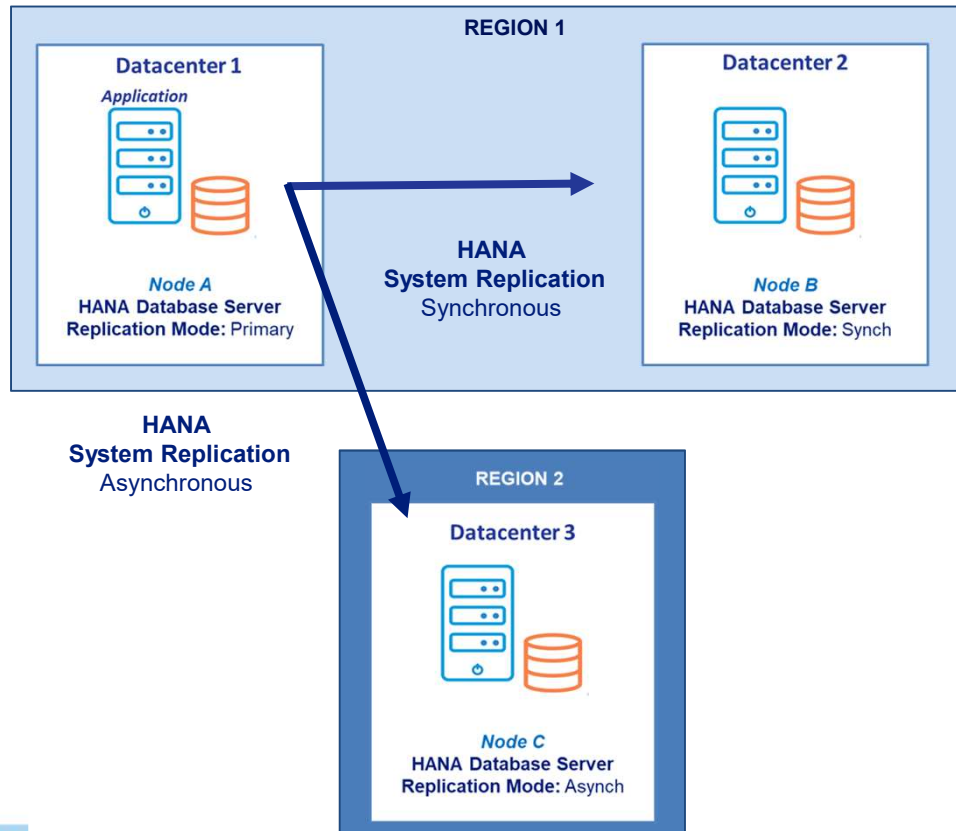


- 1. Redundant, Geographically Separated Nodes**
- 2. Reliable, Automated Failover**
- 3. Eliminate Human Errors and Manual Hassles with Automation**





Redundant Nodes with Geographic Separation

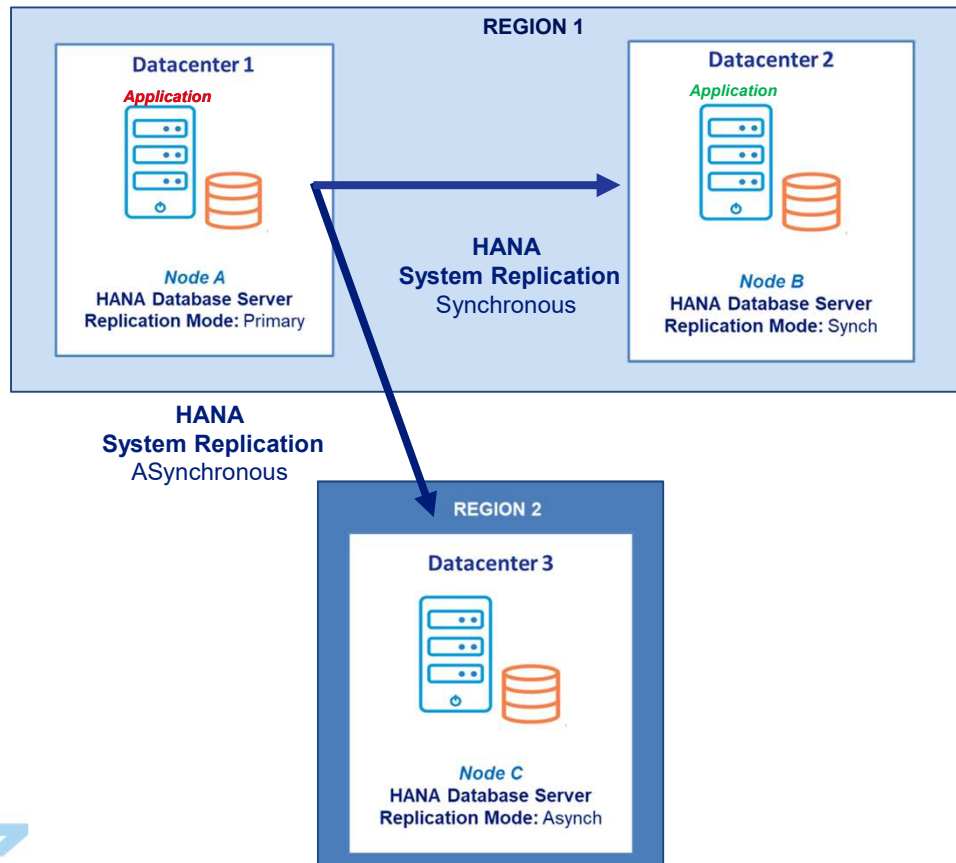


Recommendations:

- **Maintain a standby copy of the database instance in a separate AZ**
- **Synchronously replicate data** to secondary database host for zero RPO
- **Keep standby database running with important tables pre-loaded into memory**, if possible, to create a “hot standby” for low RTO



Ensure Reliable, Automated Failover

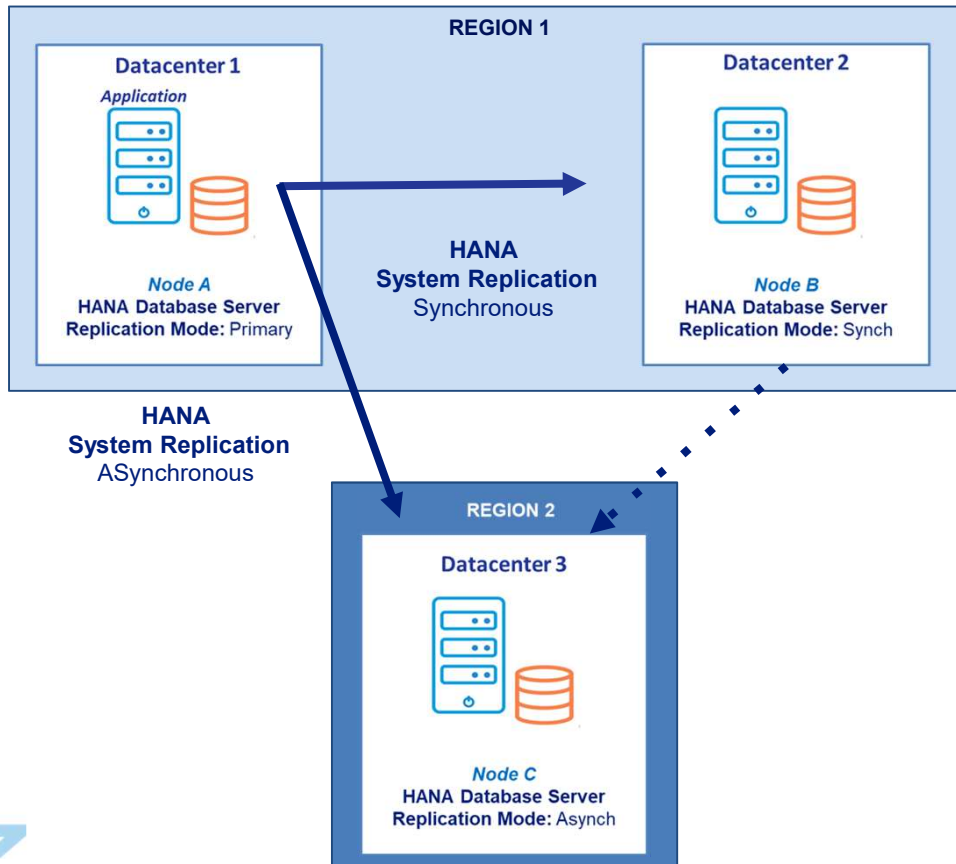


Recommendations:

- **Reliable Applications and Databases Failover**
Interdependencies, App-specific requirements
- **Application Intelligence -**
Automatically failover according to vendor best practices
- maximum reliability



Eliminate Human Errors and Manual Hassle



Recommendations:

- **Keep Run Books Updated**
- **Cross Train Staff**
- **Automate Manual Steps**
 - Simplify setup and configuration
- **Avoid Failover**
 - Restart before full failover
 - Hands-free failover
- **Simplify Replication Management**
 - Replicate to DR site(s)
 - Automatically Maintain DR protection
 - Restore normal settings when needed



SIOS High Availability Solutions



SAP® Certified
Integration with SAP S/4HANA®

SAP® Certified
Integration with SAP NetWeaver®



Application-Aware Automated Failover Orchestration

- SIOS LifeKeeper for Linux
- SIOS LifeKeeper for Windows

Automated recovery from failures at any layer of the IT Stack. (hardware, OS, network, storage, file shares, database, applications) and Application-Aware Automated Failover.

Supports HANA System Replication



High Performance Block-level Data Replication

- SIOS DataKeeper Cluster Edition for Windows
- Optional Replication for LifeKeeper for Linux or Windows

Integrated DataKeeper functionality for WSFC





Application Recovery Kits



Application Recovery Kits (ARKs) for SIOS LifeKeeper provide out-of-the-box application-specific intelligence.



Wizard-Driven Automated Configuration and Management

No time-consuming, error-prone manual scripting. Automatic validation of user input for error-free configuration and management.



Application-Aware Failover Orchestration

Monitors and protects all layers of the stack and maintains application-specific best practices for failover and recovery.



Protects Custom and Commercial Applications

Any application can be protected with a custom resource type as long as LifeKeeper knows how to start, stop, monitor, and recover it.



SAP HANA Recovery Kit



Out-of-the-Box HA and DR for SAP HANA Environments

- Intelligent, application-aware failover orchestration
- Protection for SAP HANA scale-up clusters utilizing HANA System Replication (HSR)

Maintains SAP Best Practices Throughout Recovery and Failover

- Monitors and recovers all required instance processes as well as supporting services (e.g., SAP Host Agent, SAP OS Collector, SAP Start Service)
- Monitors HANA System Replication status to prevent accidental data loss caused by attempting HSR takeover while replication is out-of-sync
- Maintains “hot standby” running standby database for quick switchover and failover
- Supports SAP HANA Takeover with Handshake feature for decreased downtime during planned maintenance windows



Conclusion



- **HA/DR best practices are important and on-going**
- **Reliable failover and replication mgmt are essential**
- **Enable IT Team with documentation and automation**
- **Test regularly**
- **Work with HA/DR experts**





Thank you!

For more information,
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