TeamMax VM HA+

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Virtual Machine Elastic Redundancy and Disaster Recovery
Technology Platform

Overview

TeamMax VM HA+[+] is a virtual machine elasticity backup and disaster recovery technology within the TeamMax's Cloud product suite. It features redundancy and fault-tolerance technologies, offering a lightweight and easily installable solution capable of managing multiple physical hosts with integrated backup functionality. Compared to traditional backup methods, TeamMax VM HA+[+] introduces fault-tolerant capabilities, enabling rapid incremental replication of virtual machines. It can swiftly migrate virtual machines in the event of power outages or generator failures without the need for additional control software, and it maintains compatibility with existing software. Furthermore, it provides flexible management mechanisms allowing users to freely configure the desired Recovery Point Objective (RPO) and Recovery Time Objective (RTO). In addition, TeamMax VM HA+[+] incorporates proprietary checkpoint establishment technology, enabling rapid replication at millisecond-level intervals. This ensures synchronized replication of dynamic virtual machine data, including CPU, RAM, and HDD states during runtime. In the event of an incident, its automatic failure detection technology activates immediately. If the redundant host detects no response from the primary service host through both independent network connections, it instantly assumes control to maintain uninterrupted service availability.

Features

Lightweight Installation

- Minimal Installation Steps
- No Control Node Architecture
- Avoids Single Point of Failure
- No NAS/DAS Required
- Supports Virtual Machine Migration and Hot Standby
- Installation via Installer or Container
- Compatible with Existing Operating Systems[1] and Deployments

Virtualization Support

- Single Interface for Multi-Host Management
- Standard VM Lifecycle Operations (Create/Delete, Start/Stop, Migrate)
- VM Console Access
- Compatible with Windows Server 2008 R2 through Windows 11 (UEFI+TPM), as well as Popular Linux Distributions
- Based on KVM/QEMU and libvirt Technologies
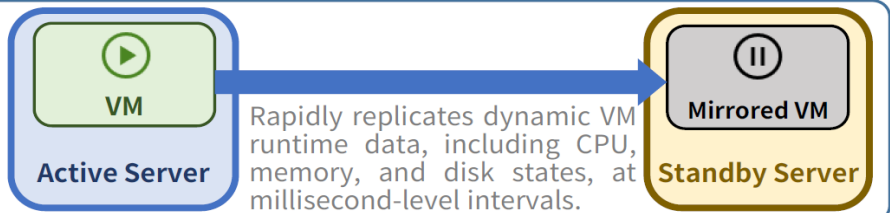- Compatible with Common[2] KVM Platform Drivers

Built-in Redundancy

- Built-in On-Demand Fault Tolerance and Disaster Recovery
- Flexible RPO Options[3]
- Ensures No Data Loss for Unwritten Data
- Automatic Detection of Physical Host Failures or Manual Migration
- VM Downtime as Low as 100 milliseconds[4]
- Adaptive Intelligent Compression Replication Technology Adjusting Automatically to Network and Hardware Specifications, Suitable for WAN and LAN Environments
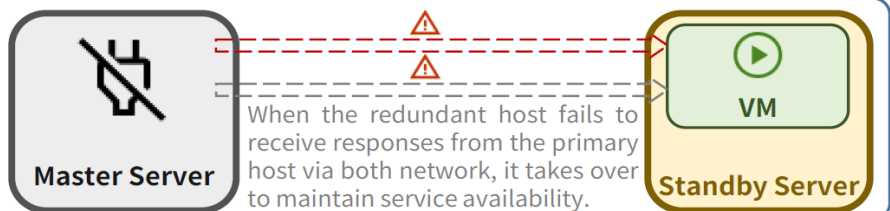
Technical Capabilities

Daily Operations

Under Normal Conditions

VM — **Active Server**

Rapidly replicates dynamic VM runtime data, including CPU, memory, and disk states, at millisecond-level intervals.

Mirrored VM — **Standby Server**

Incident Occurred

When the primary service host encounters an unexpected failure
(Enable automatic fault detection)

Master Server

When the redundant host fails to receive responses from the primary host via both network, it takes over to maintain service availability.

VM — **Standby Server**

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[1] Operating systems with Linux kernel version 4.15 or preferably 5.15 and above, supporting KVM virtualization, such as Ubuntu 20.04 and Ubuntu 22.04.
[2] OpenStack, Nutanix AHV, Proxmox VE, Synology VMM, Red Hat RHV, etc. [3] Options range from 0 to 12 hours. [4] Tested with edge computing communication software, service packet recovery takes less than 100 ms from the moment the primary host power is disconnected. Equipment must meet network latency and bandwidth requirements.

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Flexible Redundancy Options

Explanation of RPO

Based on application protection requirements and available replication network bandwidth, different redundancy levels can be configured to achieve the desired Recovery Point Objective (RPO), minimizing the duration of data loss following unexpected disasters.

Standard Disaster Recovery
Scheduled or low-load period backups
(RPO: 1 minute to several hours)

Standard Disaster Recovery
Continuous backups
(RPO: < 1 minute)
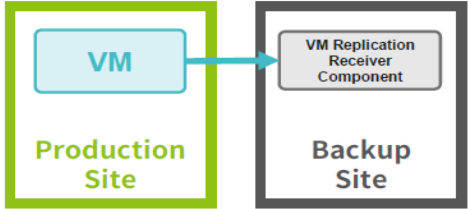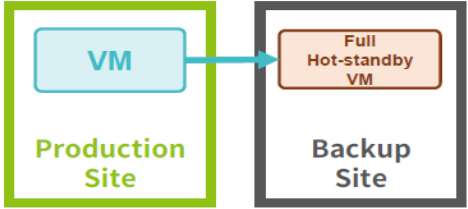
Fault-Tolerant Redundancy
Zero data loss
(RPO = 0)

- Suitable for applications with lower real-time backup requirements.
- Saves network bandwidth.
- Scheduled backups or automatic backups during virtual machine idle periods.

- Balances backup immediacy and replication bandwidth requirements.
- Continuously replicates application activities and data at the granularity of seconds when bandwidth permits.

- Suitable for critical applications demanding continuous availability.
- Higher bandwidth consumption.
- All application activities are synchronously replicated to the backup site, ensuring consistent failover.
- Backup site seamlessly continues operation without data or connectivity loss, even if the primary host fails.

RTO and Recovery Options

Backup Site Recovery Method	Pilot-Light		Hot-Standby	
	VM — Production Site	VM Replication Receiver Component — Backup Site	VM — Production Site	Full Hot-standby VM — Backup Site
Description	All VM data replicated to backup site disk storage; transfer memory during regular operations, but requires reading from disk to fully recover VMs.		VM memory data replicated directly to backup site memory; only needs to restore vCPU and virtual devices state for recovery.	
RTO	Several minutes to tens of minutes (depending on disk performance)		Millisecond to one second	
CPU Usage	Only replication receiver component (VMs don't run compute tasks)			
Memory Usage	Replication receiver component only (avg. 500 MB)		1:1 VM configured memory and replication receiver component	
Storage Usage	1:1 VM disk space and 1:1 VM configured memory		1:1 VM disk space	

About TeamMax

TeamMax focuses on public/private cloud, high-performance computing, software-defined storage, white-box servers, smart surveillance, smart communities, and smart city solutions. It provides AI image analysis, IoT integration, and efficient data management technologies to create safe, efficient, and intelligent urban and community environments, supporting enterprises and governments in achieving digital transformation.

Contact Us

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