Service Description
Proactive Maintenance

Service Overview

This agreement ("Agreement" or "Service Description") is made between the customer ("you" or "Customer") and the Dell entity identified on Customer's invoice ("Dell"). By purchasing these Services (as defined herein) from Dell, Customer agrees to be bound by all terms and conditions set forth in this document. Dell is pleased to provide this Service Description in connection with Customer's applicable signed service agreement with Dell or, in the absence of such agreement, Dell's Customer Master Services Agreement, which is available for review at http://www.dell.com/servicecontracts and incorporated in its entirety herein by reference.

Proactive Maintenance provides Dell customers with a maintenance event (the "Service" or "Services") on Supported Products as set forth more specifically in this Service Description to help maintain performance and reduce the likelihood of future incidents due to incompatible hardware, software, BIOS, and firmware versions. The Service will be conducted in a series of phases: discovery, analysis, and delivery. This Service may be delivered remotely.

Supported Products	Description of Service Offering*
Dell|EMC arrays (see Section 1)	Valid for Storage Area Network ("SAN") or Direct Attach Storage ("DAS") array environments consisting of a single Dell | EMC storage array and up to 23 hosts (servers) in ABU and EMEA; 10 hosts in APJ. Service includes: • Analysis of the logs from the SAN or DAS environment and its associated components, such as Dell hosts, Dell supported switches, Dell Supported Host Bus Adapters ("HBA"s) and Dell | EMC Disk Array Enclosures ("DAE"s) • Upgrade and/or update of the software array components • Identification of any issues affecting the proper operation of the array and initiating a call to the Dell Expert Center to address any identified issues
Dell PowerEdge™ servers (see Section 2)	Valid for certain Dell PowerEdge™ or PowerEdge SC™ server. Service includes: • Upgrade and/or update of the BIOS, firmware, and drivers • Identification of any issues affecting the proper operation of the server and initiating a call to the Dell Expert Center to address any identified issues
Dell PowerVault ™ storage (see Section 2)	Valid for certain Dell PowerVault™ single tape external Tape Backup Unit ("TBU"), PowerVault NXxxx series Network Attached Storage ("NAS"), or PowerVault Direct Attached Storage ("DAS"). Service includes: • Upgrade and/or update of the BIOS, firmware, and drivers • Identification of any issues affecting the proper operation of the server and initiating a call to the Dell Expert Center to address any identified issues
Dell PS Arrays and connected iSCSI SAN devices (see Section 3)	Valid for Storage Area Network ("SAN") consisting of a Dell PS Array up to 23 physical hosts (servers) and up to 4 VM's per physical host per storage group in a replicated environment. This service is limited to Dell bundled Software, recommended Switches, Servers with approved Initiators and all Dell PS Array models Service includes: Storage • Analysis of the Diags and SAN HQ archive files from the PS Array to include network retransmits, soft disk errors and firmware version. Also included will be an analysis of the space utilization to identify if adequate free space is maintained • Snapshot allocation and schedule review Server • Each of the physical and virtual servers will have their, Initiator, HBA (bios and driver) or NIC (driver) checked to ensure approved versions are installed and correctly configured • DSM Configuration and or MPIO settings Switch • Analysis of the iSCSI SAN Switch configurations based on Dell best practice recommendations.

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SAN

- Recommended upgrades, patches and/or updates of software on the arrays, servers and or switches, components will be identified and guidance provided on how the customer can deploy said upgrades
- Identification of any issues affecting the proper operation of the SAN and initiating a call to the Dell Expert Center for Dell products covered under a separate maintenance agreement to address any identified issues. For non-Dell products the customer will be advised to contact the appropriate vendor
- With the customers assistance a logical diagram of the environment having this service will be created and provided as part of this service

If Replication is enabled (Requires Proactive Maintenance on all arrays in the group at primary location and all arrays in group at destination location)

- Replication allocation and schedule
- Review of WAN bandwidth and latency

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* Issues outside the scope of this Service must be addressed by the Customer pursuant to Dell support processes.

Support Procedures

Customers may contact the Dell Expert Center by telephone (phone number found at http://support.dell.com) to schedule Service. Services may be delivered 24 hours a day, seven days per week, subject to mutual Customer and Dell resource availability.

Section 1: SAN Maintenance

Scope & Key Service Steps

Dell|EMC arrays. Proactive Maintenance delivery related to Dell|EMC arrays includes, but is not necessarily limited to, the following:

1. **Discovery.** The following information will be collected for review:
    *   Storage processor event logs,
    *   Storage processor configuration logs,
    *   Switch configuration and event logs, and
    *   Storage array related host information:
        *   NOS and service pack versions
        *   HBA driver revision
        *   HBA firmware (utilities or downtime may be required)
        *   Failover software versions and path status information
        *   Navisphere Agent™/CLI versions

2. **Analysis.**
    *   Review the following logs and identify current or potential issues in the environment that may be impacting functionality and reliability:
    *   Storage processor event logs – Array related events that may affect the DPE and DAE devices.
    *   Storage processor configuration logs – potential issues, array based software revisions and host connectivity status as seen by the array.
    *   Switch configuration and event logs – port-by-port review looking for error counters that would indicate a failure or potential failure on devices outside of the host or DPE (examples include, but are not limited to, cables and internal switch related hardware).
    *   Storage array related host information – Analysis of Storage array related software revisions, path status, event logs (these events include, but are not limited to, HBA driver, failover software, device timeouts on Storage array based Logical Unit Number ("LUNs") or Read/Write events on Storage array based LUNs).
    *   Notify the Customer regarding the steps required for Service delivery including but not limited to, preparation, time required to perform the Services and potential issues

3. **Service Delivery**
    *   Upgrade or update of the array software and firmware as necessary, including:
        *   Navisphere Manager™
        *   Navisphere Agent™
        *   Array Base code/flare code
        *   HBA driver
        *   HBA firmware
    *   If the Customer has purchased and implemented the following software, it will also be updated:
        *   Access Logix™
        *   MirrorView™/A and MirrorView/S,
        *   Navisphere Analyzer™
        *   PowerPath/ATF™
        *   Replication Manager™ SE CLARiiON
        *   SANCopy™
        *   SANCopy™/E for AX100, AX150, and CX300
        *   SnapView™

- Visual SAN™
- MirrorView CE™
- If issues are discovered that are affecting the functionality and reliability of the array, contact Dell Storage Support to initiate a resolution for the Customer. Additional charges could apply unless covered by the Customer's existing support agreement.

4. **Project Closeout**
   - Verify the following:
     - Successful reboot of the storage array
     - Visibility of LUNs/Virtual Disks to the appropriate hosts
     - Email home functionality
   - Provide documentation to reflect the work performed during this engagement.
   - Obtain customer sign off acknowledgement

Service Does Not Include:

1. Multiple arrays (each array requires a separate Service agreement).
2. Any activities related to hardware or software other than those specifically noted in this Service Description. These include, but are not limited to, the following:
   - Tape backup devices & software,
   - Non-Dell|EMC disk enclosures,
   - Any Non-Dell hardware and software,
   - NAS hardware other than Dell PowerVault™,
   - Applications such as Visual SRM™, Exchange™, SQL™, Oracle®, and back office applications, and
   - Host Network Operating Systems ("NOS"s) and updates, patches, or Service Packs.
   - Performance tuning.
   - De-installation or re-installation of product(s) or application(s).
3. Any design changes or consultation services (such as how to best utilize any enhancements contained in the new software versions).
4. Reconfiguration of any of the Customer's hardware or software.
5. Advanced support for unsupported software.
6. Provision of additional hardware or software licenses.
7. Any activities other than those specifically noted in this Service Description.

Customer Responsibilities

1. Make appropriate system maintenance window(s) available for Dell (or authorized agents) as needed and consider the following:
   - Customer will support all required activities to enable remote collection of all data required to support the analysis phase of the process
   - When requesting hardware/software additions, the Discovery phase will not commence until the hardware/software is confirmed to be at the location where the Service will be delivered,
   - The service Delivery can be rescheduled but not past the end of the contract term.
   - During the Service Delivery phase, the software upgrade can cause a temporary loss of connectivity to any attached hosts, and
   - After the software upgrade, the host may need to be rebooted and verified to be in working order.
2. Customer's site ID must be registered on the EMC® Powerlink website for any activities requiring EMC software. The registration process can take up to four business days to complete.
3. Ensure that the network operating system on each Dell|EMC host is at the required Service Pack or Patch level in accordance with the instructions on the design workbook SOW provided.
4. The desired configuration must meet the vendor's system minimum requirements for hardware and software configuration (service pack/kernel, BIOS, etc.).

5. Refrain from making any changes to the system between the discovery and service delivery phase of the Service.

6. Ensure that any third party hardware or software components are compatible with any upgrade performed to the Dell|EMC array environment and if necessary, purchase additional services and/or hardware/software from those third parties or Dell in order to ensure interoperability within the storage solution.

7. Customer must support the remote data collection activities required during the discovery phase including running collection tools.

8. Provide management station to support service delivery.

Section 2: PowerEdge & PowerVault Maintenance

Scope & Key Service Steps

PowerEdge/PowerVault maintenance. Proactive Maintenance delivery related to servers & storage includes, but is not necessarily limited to, the following:

1. **Discovery.** The following information will be collected for review:
   - System firmware, also known as the Embedded Systems Management ("ESM") firmware,
   - Dell Remote Access Controller ("DRAC") firmware,
   - Embedded Remote Access ("ERA") firmware,
   - Broadcom & Intel NIC drivers,
   - PowerEdge Expandable RAID Controller ("PERC") firmware and driver,
   - Cost-Effective RAID Controller ("CERC") firmware and driver,
   - IDE Controller drivers,
   - Baseboard Management Controller ("BMC") firmware,
   - SCSI Backplane ("BP") firmware, and
   - SAS BP firmware.

2. **Discovery/Analysis**
   - Review the collected information to determine the following:
     - Current BIOS, firmware and driver revisions running on the server(s) and storage devices, and
     - If server hardware is not fully operational, take necessary corrective actions to resolve.
   - Notify the Customer regarding the steps required for Service delivery including, but not limited to, preparation, time required to perform the Services, potential issues, and the possibility that additional services and fees may apply to correct such issues.

3. **Service Delivery**
   - Upgrade or update of the server or storage BIOS, firmware, and/or drivers.
   - If issues are discovered that are affecting the functionality and reliability of the storage or server hardware, Dell will work collaboratively with the Customer to resolve the issue.

4. **Project Closeout**
   - Verify all server and storage hardware updated to latest Dell known good state.
   - Verify Systems that were updated, perform as before Service delivery Provide documentation to reflect the work performed during this engagement.
   - Obtain customer sign off acknowledgement.

Service Does Not include

Any activities beyond the scope of the services described in this Service Description, including but not limited to the following:
- Hardware additions.
- OS Updates (e.g. Service Pack updates, Security Updates).
- Maintenance of servers (not listed by Dell with an eligible server tag) that have no service coverage.
- Maintenance of hardware not qualified by Dell Engineering.

Customer Responsibilities

1. Make appropriate system maintenance window(s) available for Dell (or authorized agents) as needed and consider the following:
   - Customer will support all required activities to enable remote collection of all data required to support the analysis phase of the process
   - When requesting hardware/software additions, the Discovery phase will not commence until the hardware/software is confirmed to be at the location where the Service will be delivered,
   - Allow the Engineer to connect a laptop to the internal network with appropriate administrative rights,
   - The service Delivery can be rescheduled but not past the end of the contract term.
   - During the Service Delivery phase, the software upgrade can cause a temporary loss of connectivity to any attached hosts, and
   - After the software upgrade, the host may need to be rebooted and verified to be in working order.
2. Ensure the desired configuration meets the vendor's minimum system requirements for hardware and software configuration (such as service pack/kernel and BIOS.).
3. Refrain from making any changes to the system between the discovery and service delivery phase of the Service.

Section 3: Dell EqualLogic SAN Maintenance

Scope & Key Service Steps

Dell EQL arrays. If a customer has more than one array in a group providing a single storage service, Proactive Maintenance cannot be provided for that group unless the customer has purchased Proactive Maintenance for each array in that group. Proactive Maintenance delivery related to Dell EQL Arrays includes, but is not necessarily limited to, the following:

1. **Discovery.** The following information will be collected by the customer for review:
   - Diagnostics from all members
   - SANHQ archive and generated reports
   - Run the provided Dell PS Array analysis tool to capture the configuration
   - Switch configurations, firmware revision and point-to-point information. If replication is enabled, the same information is required from the other location
   - Server configurations to include :
     - Initiator versions
     - NIC driver versions.
     - HBA driver versions
     - HBA BIOS versions
     - Virtual Server Network Configuration (VMware, Hyper-V or Xen server)
   - Snapshot or Smart copy schedules and free space allocations
   - DSM configuration if deployed
   - ASM/ME or ASM/VE configuration
   - Array free space review

   If Replication is enabled
   - Replication schedules including the RTO and RPO requirements for the business applications recognizing that each application or user group may be governed by different rules.
   - Failback procedures
   - WAN review

2. **Analysis.**
   - Review the following logs and identify current or potential issues in the environment that may be impacting functionality and reliability:
     - PS Array Diagnostics – Array related events that may affect the reliability of the SAN.
     - SANHQ Archive review for indications of performance bottlenecks, high latency conditions by volume or network packet errors
     - Analyze the output from the provided Dell PS Array analysis tool for indications of any preventable issues
     - Switch configurations and event logs – port-by-port review looking for error counters or incorrect setup that would indicate a failure or potential failure on devices outside of the host (examples include, but are not limited to, cables and internal switch related hardware)
     - Ensure VLAN's configured for iSCSI are not the Default VLAN. Search for possible loops and Spanning Tree correctly setup for the environment
     - Storage array related host information – Analysis of Storage array related software revisions, path status, event logs (these events include, but are not limited to, Initiators, HBA or NIC driver, high retransmit counts that require attention.

- Review Snapshot or Smart copy schedules to determine if they are meeting the needs of the customers business
- Ensure the correct exclusions are included in the DSM configuration
- Review of the ASM/ME or ASM/VE configuration
- Ensure free space is being maintained

If Replication is enabled

- Review of replication schedules and sizing allocated for 'fast failback' if that is set up as part of the strategy to return to primary site after a disaster
- Validate Failover and Failback procedures
- Identify whether opening up the receive window at remote array is required
- A review of the WAN performance and latency numbers provided by the WAN provider

3. **Service Delivery**
- Document the SAN configuration as found
- If the Customer has implemented the following software, it will also be reviewed and recommendations made:
  - SANHQ
  - Host Integration Tools, Including DSM, ASM/ME and ASM/VE
- Document the steps required to correct the anomalies
- Document what issues should be corrected by a call to the Dell Support Center
- Document what issues should be corrected by a call to another Vendors Support Center
- Notify the Customer of the steps required for them to take to implement suggested changes
- If issues are discovered that are affecting the functionality and reliability of the Dell PS array, Dell PowerConnect Switch or Dell PowerEdge Server, contact Dell Support to initiate a resolution for the Customer. Additional charges could apply unless covered by the Customer's existing support agreement
- If the customer requires Dell to make the recommended changes remotely, take care of them immediately if system is available or refer back to PM to schedule

4. **Project Closeout**
- Verify the following:
  - Validate all recommended corrective actions have been taken (may require action at a later date than the initial contact)
  - Review of SANHQ archive post delivery of this service as to confirm corrective actions have been completed as required
- Provide documentation to reflect the work performed during this engagement.
- Obtain customer acceptance and sign off confirming delivery of said services

Service Does Not Include:

1. Multiple arrays (each array requires a separate Service agreement).
2. Any array or device that is not under a current ProSupport contract.
3. Any activities related to hardware or software other than those specifically noted in this Service Description. These include, but are not limited to, the following:
- Tape backup devices & software,
- Any Non-Dell hardware and software or any storage arrays out of warranty,
- NAS hardware other than Dell PowerVault™,
- Applications such as Visual SRM™, Exchange™, SQL™, Oracle®, and back office applications, and
- Host Network Operating Systems ("NOS"s) and updates, patches, or Service Packs.
- Application Performance tuning.
- De-installation or re-installation of product(s) or application(s).
- Setting up Replication

- Switches, routers and WAN optimization devices outside of the Dell EqualLogic iSCSI SAN environment.
1. Any design changes or consultation services (such as how to best utilize any enhancements contained in the new software versions).
2. Reconfiguration of any of the Customer's hardware or software.
3. Advanced support for unsupported software.
4. Provision of additional hardware or software licenses.
5. Any activities other than those specifically noted in this Service Description.

Customer Responsibilities

1. Make available in a timely fashion requested system, switch and array information
   - Customer will support all required activities to enable remote collection of all data required to support the analysis phase of the process
   - Including but not limited to, all identified servers connected to the SAN for this Proactive Maintenance
   - Storage group and its associated members for this Proactive Maintenance
   - All iSCSI SAN switches connecting identified servers and Storage group members
2. Customer's site ID must be registered on the EqualLogic website that is located at http://support.dell.com/equallogic for any activities requiring PS Array software. The registration process can take up to two business days to complete.
3. Ensure that any third party hardware or software components are compatible with any upgrade performed to the Dell EqualLogic array environment and if necessary, purchase additional services and/or hardware/software from those third parties or Dell in order to ensure interoperability within the storage solution.
4. Customer must support the remote data collection activities required during the discovery phase including running collection tools and manual capture for Arrays, switches and server information.

Important Additional Information & Customer Responsibilities Applicable to All Customers

Additional Customer Responsibilities

1. Customer must maintain the confidentiality of the order number provided by Dell in connection with these Services. Dell is not responsible for unauthorized use of a Customer's contract or order number.
2. Customer must provide and have valid licenses for all hardware and software components, upgrades, and updates.
3. Ensure that that all hardware components are functioning with no open support incidents prior to Dell delivering this Service.
4. Customer must have a valid hardware support contract (such as "ProSupport for Your Enterprise") on all affected systems.
5. Provide at least one technical contact with system administration responsibilities and appropriate system/information access privileges.

Software/Data Backup. It is the Customer's responsibility to complete a backup of all existing data, software, and programs on Supported Products prior to Dell performing any Services. Loss of Data & System Downtime. DELL IS NOT RESPONSIBLE FOR LOSS OF OR RECOVERY OF DATA, PROGRAMS, OR LOSS OF USE OF SYSTEM(S) OR NETWORK arising out of the services or support or any act or omission, including negligence, by Dell or a third-party service provider.

Cancellation. Dell may cancel this Service at any time during the Service term for any of the following reasons: Customer fails to pay the total price for this Service in accordance with the invoice terms; Customer makes a misrepresentation to Dell or its agents; Customer refuses to cooperate with or threatens in any manner the assisting technician; Customer's repeated misuse of this Service for out of scope issues; or Customer otherwise breaches or fails to abide by all of the terms and conditions set forth in this Service Description.   If Dell cancels this Service, Dell will send Customer written notice of cancellation at the address indicated in our records. The notice will include the reason for cancellation and the effective date of cancellation, which is not less than thirty (30) days from the date Dell sends notice of cancellation to Customer, unless state law requires other cancellation provisions that may not by varied by agreement.   Any refund is determined by Dell based on the passage of time and/or the number of support incidents at Dell's discretion.

Term. The Service shall expire at the end of the agreement period as reflected on the Customer's invoice or use of the entitled Services, whichever comes first.

Not Transferable. The Services are not transferable. Customer may not use the Services in connection with a service bureau or any other distributing or sharing arrangement, on behalf of any third parties or with respect to any hardware or software not directly owned by the Customer.

Confidentiality. Customer acknowledges and agrees that (1) Dell may access any information (including personal information) contained in Customer's IT environment in connection with the performance of the Services, and Customer also may provide information (including personal information) to Dell by telephone or otherwise; (2) Customer is authorized by law or otherwise to disclose the information to Dell, and (3) Dell will access Customer's IT environment from the United States and elsewhere. Dell will handle personal information that Customer may disclose, or that Dell may access, in connection with the performance of the Services in accordance with Dell's privacy policy, available at http://www.dell.com/privacy

Authorization to Maintain & Access Customer Data and Assets via Remote Technologies. By purchasing the Services, Customer acknowledges that Dell will access, connect to and manage devices

via remote technologies (except where prohibited by law), including storage of Customer identification and passwords. Dell reserves the right to refuse the service if Dell deems that the task cannot be performed remotely. Customer represents and warrants that they have obtained permission for both Customer and Dell to access and use the all hardware and software components, including stored data, for the purpose of providing these Services. If Customer does not already have that permission, it is Customer's responsibility to obtain it, at Customer's expense, before Customer asks Dell to perform these Services.

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