HP StorageWorks XP Disk Array Remote Support Service With Continuous Track

Introduction

With the rapid increase of e-commerce, data warehousing, and data mining, storage has become a strategic resource within an enterprise. Businesses must access their data instantly and continuously. The criticality of data availability dictates that the storage systems must be up and running all the time. Unplanned downtime not only costs money but also loses customers. IT departments need the ability to continuously monitor their storage services and resolve their problems proactively and immediately.

With leading diagnostic technology, HP StorageWorks Continuous Track provides 24 x 7 around-the-clock worldwide service capabilities for XP arrays to achieve the highest level of availability. It allows XP arrays to be continuously monitored 24 hours a day by expert systems and engineers at HP Response Centers. Service events are reported instantly. Hardware failures are detected immediately. Potential problems can be investigated and resolved proactively by HP engineers before the customer's business is affected. The Continuous Track support service substantially eliminates unplanned downtime and increases the availability of customer storage, applications, and data access.

This white paper gives detailed descriptions of HP remote support technology for XP arrays with Continuous Track and discusses the architecture design and main functions of Continuous Track and the advantages and benefits of using it. It also addresses the most common security questions about remote access and support.
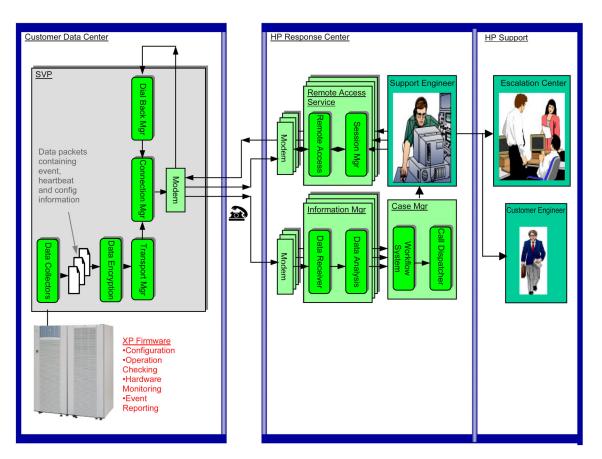
Overview of architecture design

Continuous Track deploys the modern client-server architecture, which mainly contains two parts—client and server (Figure 1). The client software, running on the disk array service processor (SVP) of each customer XP array, is responsible for monitoring events reported by the XP array firmware and generating heartbeat and configuration information that is sent to an HP Response Center. It also manages data and communication security by using encryption, authentication, and dial-back technology. Running the client software on the SVP, which is located inside the XP array and totally independent of any customer servers, greatly increases the client reliability as well as data security since the SVP cannot access customer data on XP arrays.

The server software, which runs on powerful servers at HP Response Centers, manages the data transmitted from its clients. When a Continuous Track Server receives data from XP disk array client, it checks to see if a potential problem or a service event is identified. When this happens, Continuous Track Server opens a case and passes it to its Case Manager software. The Case Manager software automatically dispatches the case to a trained XP disk array support engineer. In a typical situation, where the client is just transmitting heartbeat information, the Continuous Track Server stores the data in its data repository for future reference.

The communication between a Continuous Track client and its server uses a point-to-point connection through a phone line (modem-based connection) to ensure information security.

Figure 1.

Main functions

Continuous Track provides four distinct functions to deliver a comprehensive remote support solution for XP arrays:

- **Heartbeat and Health Checking**—ensures continuous operation of XP arrays
- **Event Notification**—detects and reports service events to the HP Response Center for monitoring and analysis
- **Configuration Collection**—provides a snapshot of the XP array configuration for troubleshooting and monitoring
- **Remote Access**—allows HP experts to investigate and resolve problems remotely

Heartbeat and health checking

Continuous Track employs a heartbeat to monitor the disk array health status. Heartbeats are generated by the Continuous Track client software on the SVP of an XP array and are sent to HP Response Centers on a daily basis. Heartbeat packets, containing the individual XP disk array ID and health information, are monitored and analyzed at the HP Response Center to verify the operation of XP arrays.

An XP array generates a heartbeat on a regular configurable time interval. If a heartbeat packet does not arrive within an expected time window, an alert is automatically generated by a Continuous Track Server and is sent to HP engineers at the HP Response Center. The engineers connect the XP array for diagnosing and troubleshooting. If the connection between the customer XP array and HP Response Center could not be established, a local customer engineer (CE) is notified. The local CE works with the customer to determine if priority response is necessary or the problem can be addressed during normal business hours.

Event notification

XP array firmware continuously monitors the array operation. Operations are checked for correct execution, status of retries, and other warnings. When a fault event occurs, the firmware reports a Service Information Message (SIM). Continuous Track client software running on the SVP listens for SIM events, collects information on those events, and determines the severity of those events. If a SIM event is significant, it is sent to Continuous Track Servers by way of modem connection without any delay, and a call will be opened for immediate attention by the HP Response Center. The trained HP support engineers, who monitor calls 24 hours day and 7 days a week, will start to work on the case promptly. They have access to all necessary resources, including the HP Storage Escalation Center and CEs. The case is worked on and monitored until the problem is successfully resolved. All other (non-critical) SIMs are accumulated and stored on the SVP, and then transmitted to Continuous Track Servers during regular heartbeat communication sessions for analysis and diagnosis. If necessary, proactive measures are taken to prevent any potential problems.

Configuration collection

Continuous Track client software also generates XP array configuration data periodically to provide a snapshot of the current XP disk array configuration. The firmware version, number and type of LUNs, physical configuration, RAID level, subsystem status, and so on are included in the configuration transmitted. By default, the configuration data is transmitted to an HP Response Center whenever the configuration changes. In the event of a problem, the latest configuration data is available and can be used as a reference to speed up the troubleshooting and problem solving.

Remote access

The remote access functionality is a key component of Continuous Track. It allows HP engineers and experts to perform investigation, diagnosis, and issue resolution remotely and quickly. In many cases, problems can be fixed using remote access instead of sending engineers on site.

For security purposes, a dial-back method is used to establish the connections for remote access. While triggered by remote engineers, the actual connections can only be initiated by the XP disk array itself using specified phone numbers to HP Response Centers. When an initial request for remote access is made to the SVP, the dial-back software performs authentication of the request through the tightly controlled accounts managed by HP Response Centers. On successful authentication, the initial connection is disconnected, and a dial-back is initiated to establish a remote session between the SVP and the HP Response Center. Again, the engineers at the HP Response Center will be prompted for user name and password for login to continue the remote access session. If the login is successful, the remote access allows the engineers and experts to use the SVP and its tools as if they were physically on the customer site.

Customer data security

Remote support systems often raise questions about security. Continuous Track is designed to address customer security concerns. The confidentiality of customer information is guaranteed because there are no connections, within XP arrays, that provide access to customer data from the SVP. Continuous Track deploys stringent security measures to ensure a complete secure remote support solution for customers. Proprietary protocol, unique data format, encryption, authentication, and best practices are integrated at physical, network, and operational levels, providing a multi-level layered security.

Security with remote connection

Continuous Track uses the dial-back method to create a point-to-point communication between customer XP arrays and the Continuous Track Servers at the HP Response Centers. This ensures that the information cannot be intercepted or hacked. As discussed previously, authentication is required for initiating each dial-back session, and all the connections are audited. If there are repeated authentication failures, remote access to the SVP is disabled for a predefined time. When a remote access request is made to the SVP of an XP array, the dial-back only calls back the Continuous Track Servers at HP Response Centers with pre-defined phone numbers that can only be modified with unique software by HP support personnel.
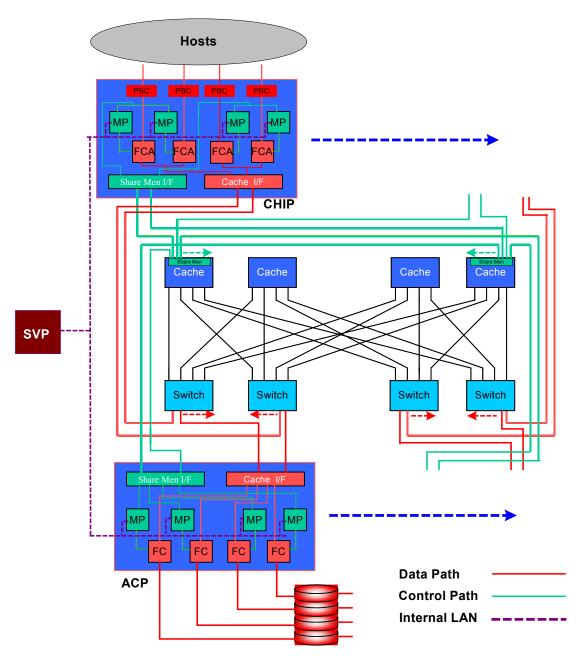
Security with file and data transfer

All communications between file and data transfer components on the SVP and file and data receive components at HP Response Center are done with a proprietary protocol and unique format. The data cannot be decoded without the definition information. All information exchanged between the XP disk array and the HP Response Centers is encrypted using industry-standard protocol to provide another layer of security protection.

Data integrity and confidentiality

Even with the ability to access the SVP remotely, the integrity and confidentiality of customer data are ensured since customer data on XP arrays cannot be accessed through the SVP. As shown in the following block diagram (Figure 2), the SVP is only connected to each microprocessor (MP) through an internal LAN, which is separate from the data paths in the XP disk array. The MPs only access control circuits; they cannot access the data. Only Fibre Channel Adapter (FCA) chips move data. Therefore, the customer data in XP arrays cannot be retrieved or changed by way of SVP by anyone, including HP support engineers.

Figure 2.

Figure 2.

Summary and conclusions

Continuous Track increases data availability effectively and efficiently by providing uninterrupted 24 x 7 monitoring and remote support. Problems can be resolved quickly and remotely. Possible failures can be prevented by taking action ahead of time. Combined with the no-single-point-of-failure design of the XP disk array hardware, remote support XP with Continuous Track can virtually eliminate XP downtime.

With the unique design of the XP array, Continuous Track provides a complete secured remote support solution with both data privacy and integrity.

Appendix

FAQs about Continuous Track security issues

1. Can someone directly log in to the SVP of my XP array through a phone line?

   No. Remote sessions can only be established by Continuous Track client software on the SVP using dial-back to the specified Continuous Track Servers at HP Response Centers.

2. Can someone modify the dial-back phone numbers on the SVP of an XP array so the dial-up calls a different phone number rather than those at an HP Response Center?

   No. The dial-back phone numbers are pre-installed on the SVP, and they can only be modified using unique software at the HP Response Center with proper authentications.

3. Can someone hack the information transmitted between Customer XP arrays and an HP Response Center?

   First, the data is virtually not interceptable since Continuous Tack uses point-to-point communication. Second, even if the phone line is tapped, the data itself is cannot be hacked due to its unique format and strong encryption.

4. Can my data be stolen or damaged if someone logs in to the SVP of my XP array remotely?

   None, including HP support engineers, can access customer data on XP arrays through the SVP since the SVP is connected to the XP disk array through an internal LAN that is separate from data paths as discussed previously in this article. So, even if someone logs in to the SVP of your XP array, the confidentiality of your data is still absolutely guaranteed.

   The logical volume formatting function, which is accessible from SVP, can reformat logical volumes resulting in data loss. However, this function is protected and cannot be used without authorization. In addition, this function can be completely disabled for remote sessions by the remote switch on the DKC panel of XP arrays.

5. What other security mechanisms are implemented with Continuous Track XP to ensure the security?

   Encryption, authentication, unique protocols, and industry best practices are integrated at physical, network, application, and operation levels providing multi-level layered security with Continuous Track.