

# Remote Console Management – Completing the total system and network management strategy

Robert Morris, SolutionStack Technologies Inc. August 15, 2004

## Introduction

Over time information systems have evolved and changed as technology has advanced. With these changes complexity has been introduced which was never imagined when computing systems were first introduced. Originally, users interfaced with programs by entering instructions using a command line interface through the system's console. In order to simplify the operation of computing systems, graphical user interfaces were introduced making applications usable by even the most novice users. The GUI helped put more power into the hands of users and heralded the era of "client-server" computing. As computing power and data became widely distributed throughout the enterprise, networking became crucial to move more and larger packets of information from user-to-user, server-to-server, and company to company. As server and network technology advanced, it became clear that the simplest way to improve the efficiency and reduce the cost of managing IT systems was to once again centralize the processing power and delivery of applications within the data center.

Throughout it all, the basic premise has never changed. The most basic and lowest level of communication with computing systems remains to this day the system console. Network and System management tools have evolved over the years as powerful applications which rely on the same TCP/IP network as our mission-critical business applications to monitor and send complex instructions to the systems and devices they oversee. They must! The amount of data generated by today's management applications is impressive to say the least.

But what happens when the TCP network is NOT available?

How much monitoring and management traffic is acceptable in a production environment?

How can secure remote access be given to the IT management team without compromising network security? Especially in these days of distributed systems, third-party consultants and out-sourced managed services.

These questions are answered here and more importantly, addressed by today's remote console management solutions. Remote console management is the final piece in a complete system and network management solution.

## **Positioning**

Systems Management was the “hype” of the 90’s with billions being spent on complex technology to “automate” all systems related transactions. Integrated solutions have become increasingly modular with companies moving to more “best of breed” solutions to ensure the best performance in each technology management area; i.e. license management & software distribution, inventory and asset control, capacity planning and load balancing, etc.

Much of these functions have been commoditized by the operating system and server vendors and the ability to manage and support distributed server infrastructure, even multi-vendor environments, has become a given.

With this commoditization and ongoing enhancements, there have been some core strengths forgotten which may provide the answer to achieving maintaining 100% systems availability.

Mainframe computing employed “dumb” terminals with users accessing all services from high performance servers. Network Computing has recently tried to restore this philosophy and Application and Managed Service Providers provide centralization and support of data centers. All of these speak to a need for central control with low complexity for the users and at an economic rate for the company.

DataStream compliments every systems management solution available and provides the disaster recovery solution for large and small organizations alike.

## **What is Out-of-Band Management**

Out-of-band is a term originally used by telecommunications companies to define the use of a dedicated channel for call control, separate from that used by the telephone call or data transmission. In system and network management, out-of-band management is a system that uses a different communication path between the managing system and the devices under its purview. To accomplish this out-of-band systems connect directly to the managed devices via their console (RS-232) port.

## **Benefits**

There are many advantages to out-of band management that make it an indispensable part of a total system and network management strategy.

### **Real-time Event Identification**

All computing systems and most network devices generate system messages or error logs as routine. Whereas most of these messages are mundane and unimportant (i.e. system clock ticked successfully), many of these messages are critical to a system’s performance and health. By passively listening and collecting these messages via the console port, remote console management can instantly alert managers to critical events as they occur. In most cases in-band monitoring and management systems poll the managed devices leading to inevitable delays in event reporting and recovery measures.

### **Passive Communication**

In-band management solutions rely on agents to monitor and manage systems. This leads to additional network traffic and also consumes valuable resources on production systems. Network elements particularly are inundated with requests for monitoring information, configuration changes, and to log system events to a local disk. The most common method of managing devices, simple network management protocol (or SNMP) uses UDP to send and receive data from managed devices. UDP is given the lowest priority possible on a production network meaning that if the network is too busy, these packets are simply ignored or dropped even though the fact that the network is too busy may be the most important information of all. Remote console management requires no agent, does not poll the managed device, and simply listens for and collects system messages already written by the systems as normal course. No additional network traffic is created, no load is placed on the managed device, and no additional software or agent need be installed or supported on the managed elements.

### **Critical Failure Recovery**

Possibly the most important benefit of remote console management is the ability to recover a device in situations where other management systems cannot. As long as the system's console remains responsive, it matters not whether the host operating system or software is fully functional. This fact alone makes remote console management a must-have in today's non-stop computing environment.

### **Secure Access**

The most important question on most network and system administrator's minds is "is it secure?" System management tools provide users with access to change configuration, monitor user activity, and permit or deny access to systems and applications at all levels of the security hierarchy. In-band solutions operate on the same channel as system users, creating a security concern. Remote console management is a "closed-circuit" system which allows only users with access to the circuit to monitor and manage the environment.

## **Challenges**

### **Distance/Cabling**

One of the most significant limitations of console management is the requirement for a direct connection to the managed device through the device's console (RS-232) port. Also it is important to note that the distances possible for serial communication are a fraction of that possible with Ethernet, typically 15m. Any distances greater than 15m require the use of a modem or (more commonly) a terminal server. It is for this reason that remote console management is typically reserved for mission-critical elements located within the data center.

### **Data Transfer**

There is a limitation to the amount of data a console device can transmit; this is due to the fact that console devices are typically serial RS232, the limiting factor being the maximum baud rate the device can be set to. This may have an impact upon the timely delivery of status messages if they are being buffered by the hardware/operating system of the managed device. Great care must be taken to ensure that only important traffic is directed to the system console, so that unimportant informational messages that do not NEED to be tracked should be suppressed. For example, is it always necessary to be informed when a user has logged on to the managed device via a telnet connection? If not, don't output the message to the console, or, redirect the message to some other form of log.

### **Complexity**

The command-line is generally the domain of the most technical of users. An intimate knowledge of the managed devices operating systems and firmware commands is required. It is for this reason that remote console management is considered to be more of a system or network administrator tool rather than an application for general use.

## Bridging the Gap

Managing devices via their console requires a direct connection to the managed device, and the managed device must also be in a close proximity to the management system. The simplest means to provide true remote console access is to simply connect a modem to the managed device. Serial console or terminal servers allow network access to consoles and also consolidate the management of multiple devices' consoles. This is getting closer to true remote console management but in order to collect and act on the information available via the system console it is necessary to introduce a remote console management application, such as Datastream, to collect, aggregate, and analyze the data. It is also important to note that while some systems store volumes of this data in the operator logs there are many hardware and operating system messages that are not (an example would be OpenVMS cluster state transition messages which are critical to monitor for)

## The Total Solution

The key to successful system and network management rests with the ability of the IT team to select the appropriate tool for the job at hand. The following are examples of how in and out-of-band technology is best applied in today's environments:

### **IN-BAND:**

- Monitoring of performance and other environmental characteristics for a device or environment.
- Rules based analysis of information collected for automatic action and notification of problems.
- Device specific agents with device/environmental knowledge base.
- Graphical depiction of environment, problems, and configuration with point and click interface.
- Historical reporting of performance and events.

### **OUT-OF-BAND:**

- Decreased mean-time to repair
- Auditing of privileged console access
- Console security.
- Reporting and auditing of console events
- Real-time event notification and automatic action execution
- Device specific knowledge base and event detection as well as explanation.
- Console logs with time stamped console information

## Conclusion

It is quite obvious that both in-band and out-of-band solutions can both provide a fairly comprehensive management solution on their own. It is even clearer that in order to provide a total solution, there is nothing more powerful than a complement of in and out-of-band technology. Unfortunately, most IT system environments have only addressed their in-band requirements and have left console management as a last-ditch effort at recovering systems when everything else fails. This is evidenced by the fact that there are a plethora of in-band solutions available on the market today with recognizable names such as HP Openview, Computer Associates Unicenter, Tivoli, and BMC patrol being the most prevalent. Remote console management applications are few and far between. With 6 years of success in some of the largest data centers and thousands of managed devices worldwide, Datastream is considered to be the industry leader.