



White Paper

The importance of network management in reducing costs, increasing value in digital signage systems



Danny Lev – Director of Product Management
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The importance of network management in reducing costs, increasing value in digital signage systems

I. Executive Overview

Selecting a fully-featured network management system has a vital role to play in reducing the operational costs of a digital signage system while maximizing its value. The architecture of such a management system and the quality of its components critically impacts an organization's ability to meet its operational targets.

The ideal network management system will offer:

- Service orchestration via a business logic Web Service interface
- Central network access via a hub and spoke architecture
- Flexible service portability via a device adaptation capability
- End to end performance monitoring and remote issue circumvention

Such a solution will:

- Reduce operational costs
- Improve operational visibility
- Increase system value

This document describes the detailed required features and the business benefits of network management within the solution which offers these achievements.

II. Introduction

The reliability, efficiency and value of any digital signage network will be significantly enhanced by the selection of a robust, fully-featured network management system. Such a system allows the optimization of operations by providing remote monitoring, control and maintenance of all elements – such as devices and media streams – within the network.

Remote monitoring gives improved visibility of system operations, allowing on-site support to be streamlined while gathering the performance statistics that are the basis of network optimization. Advanced remote control capabilities enable this optimization as well as allowing early intervention to resolve operational issues.

With over a decade of experience in developing remote management solutions for the IT industry, and being a pioneer in the Digital Signage industry, Minicom Digital Signage has gathered extensive knowledge and competences in this area, and is recognized as one of today's leader in the application of these solutions to the DS industry.

III. Problem Definition

Digital signage system operators encounter numerous challenges. Foremost among these are:

- How to orchestrate different business services within the network?
- How to centrally manage a heterogeneous network with different device types?
- How to monitor system performance and maximize uptime while minimizing operational costs?

Choosing the right network management system is critical in allowing these challenges to be overcome. Without a well-architected, fully-featured management system, inefficiencies and conflicts will certainly arise that will often lead to increased costs and decreased customer satisfaction.

IV. High Level Solution

The ideal digital signage management system will provide

- Service orchestration via a business logic Web Service interface
- Central network access via a hub and spoke architecture
- Flexible service portability via a device adaptation capability
- End-to-end performance monitoring and remote issue circumvention

V. Solution Details

1. Service Orchestration via a Business Logic Web Service Interface

A key consideration in selecting a network management system is ease of use. The ideal solution will enable the organization to focus on the business flows and processes and not be concerned by the underlying detail of the digital signage network. It will do so by providing a high level of abstraction which provides the user with a familiar interface while concealing the technicalities of the network implementation. A Web Service application programming interface (API) will deliver these benefits.

This enhanced ease of use not only delivers greater organization effectiveness; it can also reduce time to market.

Figure 1 illustrates the architecture of such a system.

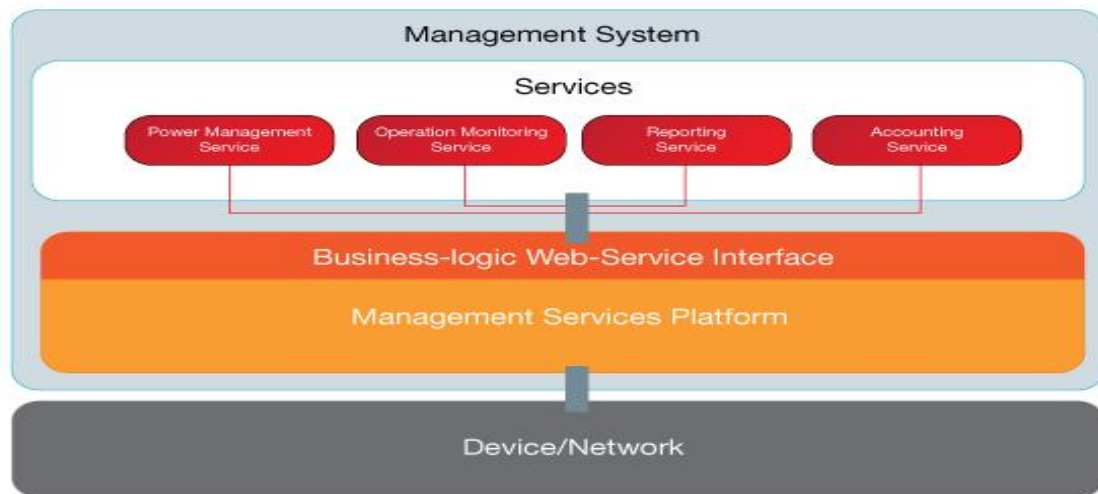


Fig 1: The ideal network management solution abstracts high level business processes from low level network/device implementation.

The optimum management system will feature a range of different services that take advantage of the business logic Web Service interface. These might include

- Power Management: managing the power of different devices in the network
- Operation Monitoring: monitoring the operation of network devices
- Reporting: notifying operators of system events
- Accounting: creating accounting logs for customer billing

Power management is an ideal example of how such abstracted services work. It is a fundamental requirement of any digital signage network that displays should be able to be powered on and off. This requires detailed knowledge of each device's characteristics, of its communication protocols and of its location in the network. A power management service allows a power management policy to be set which translates the business requirement into the low level commands necessary to reliably implement that policy. The business logic Web Service interface allows organization management to focus on high level requirements, not low level execution.

Web Services defines a communication method that enables the integration of services in a standard way that supports systems using a Service Oriented Architecture (SOA), allowing the easy orchestration of business services in business processes. SOA adopts the concept of services - a higher-level abstraction that is independent of the application, the infrastructure, the IT platform, the context or of the other services – and is ideally suited for optimum interoperability in best of breed systems and heterogeneous environments.

The Web Service platform also enables easy integration of advanced services into existing management applications (figure 2): the standard mechanism offered by Web Services technology enables the management API to be invoked from virtually any type of application.

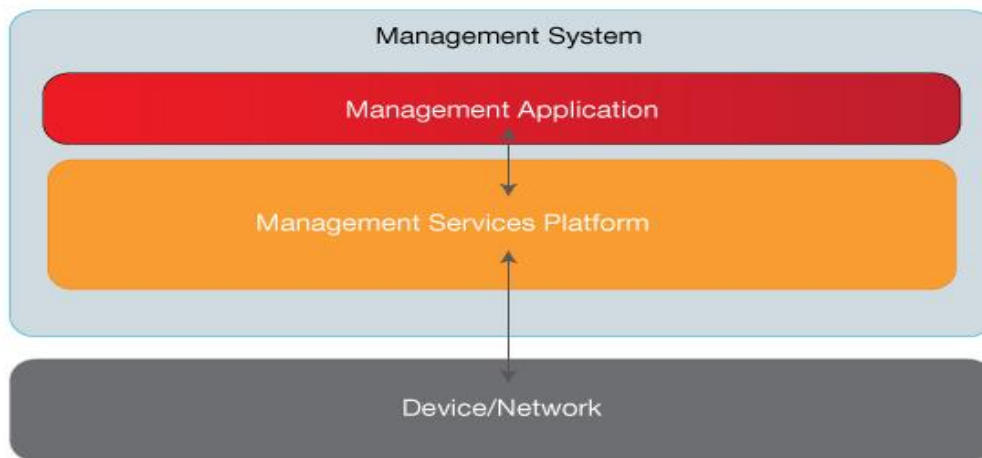


Fig 2: Management applications provide the business interface to the required services

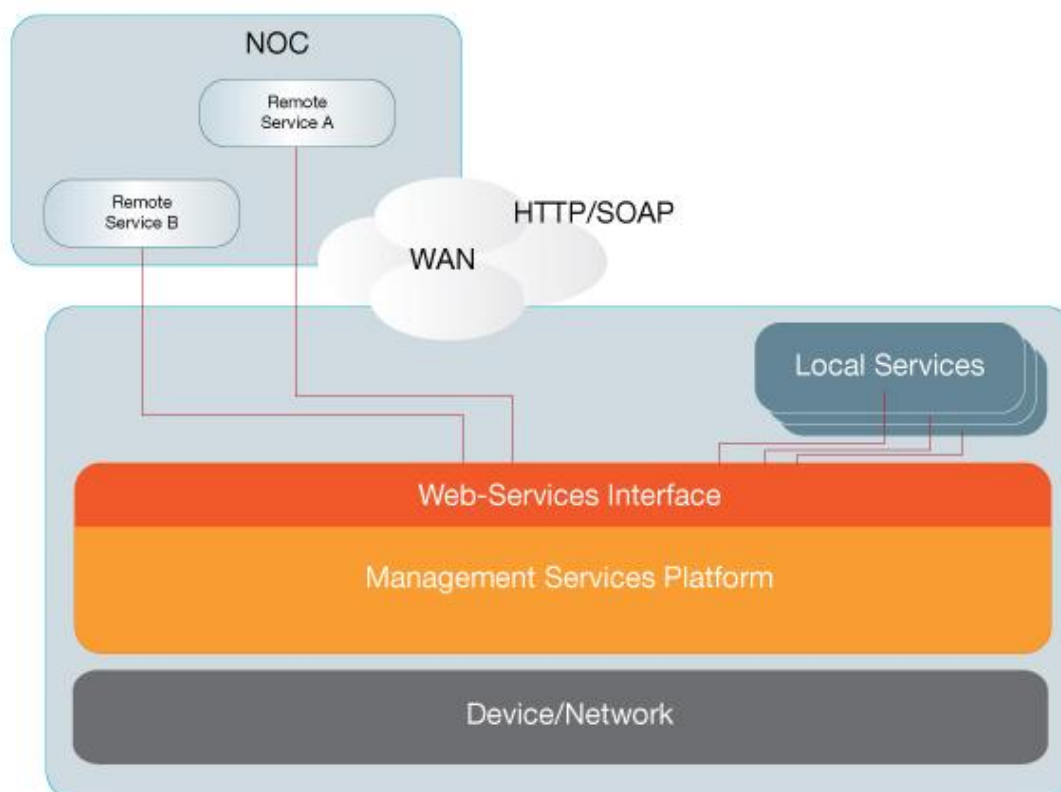


Fig 3: HTTP/SOAP provides high levels of both flexibility and security

A Web Services platform based on HTTP/SOAP (Simple Object Access Protocol) (figure 3) can offer ubiquitous secure remote access to operators over either LAN or WAN. The mechanisms offered by HTTP and the support firewalls provided for HTTP introduce great flexibility with a high level of security that enables remote services in an Infrastructure as a Service (IaaS) or a Platform as a Service (PaaS) model to be offered.

2. Central Network Access via a Hub and Spoke Architecture

It is a fundamental requirement that an organization should be able to both monitor and control every device within a digital signage network. Central network access provides management of different devices while ensuring secured access to different elements, central network policy enforcement and auditing. The ability to access different devices from one place enables collecting and cross-checking network-wide information for obtaining a high level understanding of overall performance - and root cause analysis to be performed in the event of system issues. These management capabilities must be capable of being exported to different services – but this must always be managed from a single, central point of access in order to ensure operational consistency and security throughout the network.

The ideal management service platform (figure 4) should enable central access to the different elements of the network in a hub and spoke architecture, and will act as the gateway to the management of the infrastructure.

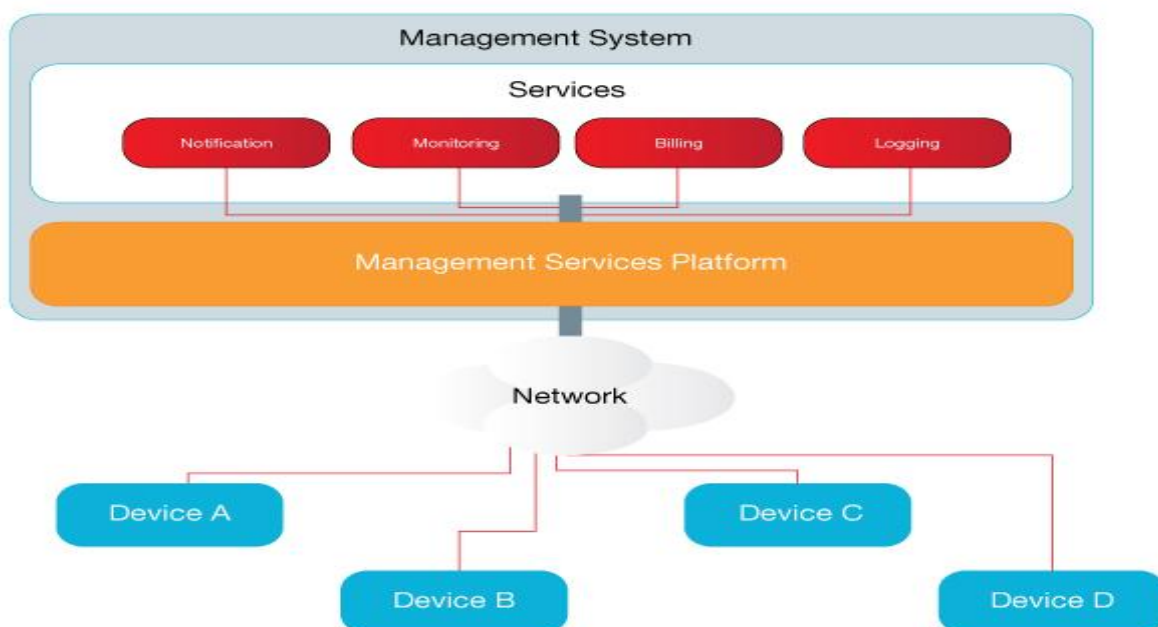


Fig 4: Multiple services use a consistent interface to the network and share the same operational snapshot, with information collected by and disseminated from a single point

3. Flexible Service Portability via Device Adaptation Capability

Change is as constant in digital signage networks as it is in all other aspects of business. In digital signage, it can mean the absorption of additional networks – or the simple substitution of one device, such as a display, with another. The key is that the management service platform is not only capable of easily adapting to change of any type – but that change should be transparent to the business flows and procedures. The architecture of the platform should separate low level implementation and execution detail from high level business processes.

The goal is to protect the investment in service development, minimizing the cost or efficiency impact of any change to the network itself, and improve operations agility. The management service platform must be capable of adapting, reconfiguring itself automatically to recognise, for example, a new type of device once that device is attached to the system. To take the simple example of the power management service: it should be able to interact with the new device with no need for the service itself to be changed (figure 5).

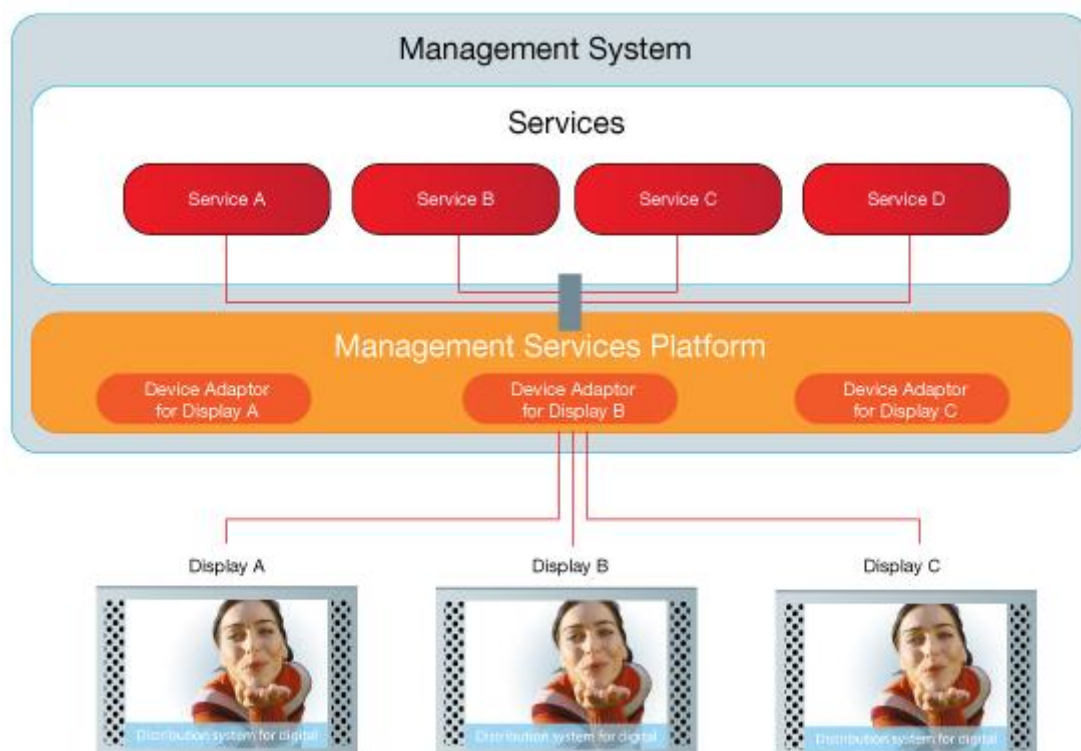


Fig 5: The concept of a 'device adapter' allows services to remain unchanged when a new device 'C' is attached to the system.

4. End-to-end Performance Monitoring and Remote Issue Circumvention

A typical digital signage system media network comprises different types of devices that facilitate the delivery of the media from media sources to displays. End-to-end performance monitoring and remote issue circumvention describes the ability to identify system issues quickly and to repair them remotely.

The optimum management system increases operational visibility, which in turn leads to increased system uptime. It will reliably and rapidly allow operational issues to be identified remotely – and resolved remotely. Such a system will perform end-to-end performance monitoring, tracking media from its point of origination to its point of destination. A failure at any point – whether of the network or of a device – can result in loss of image on the display, translating into reduced customer satisfaction, lost revenue and diminished system value.

Systems that make assumptions about whether an image is being correctly displayed based only on information about the status of the media player and the display are fundamentally flawed. A management system should have the capability to sample display media output for absolute verification and proof of performance.

Local intervention to resolve issues takes longer and costs more. In the event an issue is identified, the management platform should provide a mechanism that enables remote circumvention. If, for example, a media player becomes unavailable through failure or planned maintenance, the system should be able to remotely switch over to a secondary player in order to ensure continuous playback.

Providing proof of performance is vital to digital signage operators in maximizing revenue and profit. Remote end-to-end performance monitoring and problem resolution supports this business imperative.

VI. Business Benefits

A management platform such as that described previously will deliver important business benefits to digital signage operators. These include:

- Reduce operational costs
- Improve operational visibility
- Increase system value

The qualities that the system provides to support these business goals include:

- Increased security
- Accelerated time to market
- Operations agility
- Improved efficiency

- Superior operational consistency
- Higher uptime
- Enhanced profitability
- Greater customer satisfaction

VII. The Minicom Digital Signage Management Solution

The Minicom Digital Signage Management Solution offers the features required to maximize system ROI by reducing operational costs and increasing system value.

The ScreenGate™ Management Gateway (SMG) is a management service platform which sits at the heart of the MDS Management Solution. It offers a Web Services business logic API, enables centralized network management, and facilitates service portability using a display control adaptor plug-in mechanism.

In addition, the SMG provides remote performance monitoring and player issue circumvention via integration with MDS Remote Display Management (RDM) modules and media distribution and broadcasting systems which exist in the media-network layer.

Through its Web-Services interface, the SMG enables integration with different management services and applications, including CMS (Content Management System applications), NMS (Network Management System applications), BPM (Business Process Management services), Web Portal front-ends, BI (Business Intelligence services) and Billing applications (figure 6).

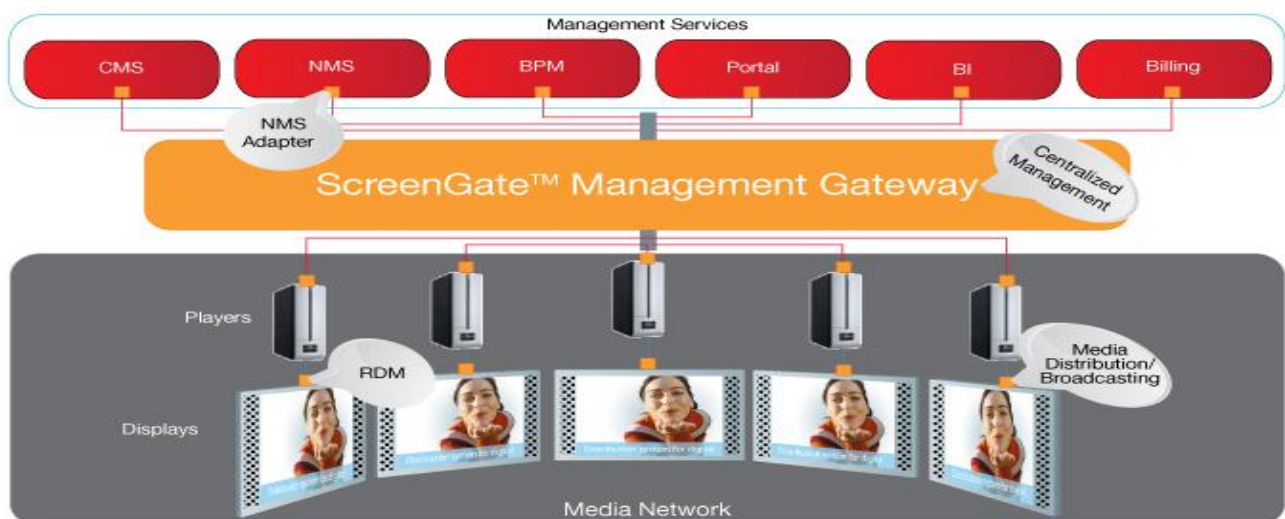


Fig 6: The ScreenGate™ Management Gateway delivers a broad-ranging, robust set of services that abstract business processes from network implementation

A unique end-to-end proof of performance remote monitoring capability is provided by a media watermarking system that marks media streams on the player side and analyzes the display media output. The analysis of presented media on the display side is possible thanks to embedded Remote Display Management (RDM) management modules which attach to different displays and sample the media output of these displays.

The media watermarking control flow consists of the following steps:

- Watermark generation
- Display output media watermark sampling
- System performance status aggregation

A performance management service (figure 7) and reporting service can use the Web Service business logic API offered by the management gateway to perform:

- Root cause analysis and circumvention
- Notification via reporting and logging mechanism

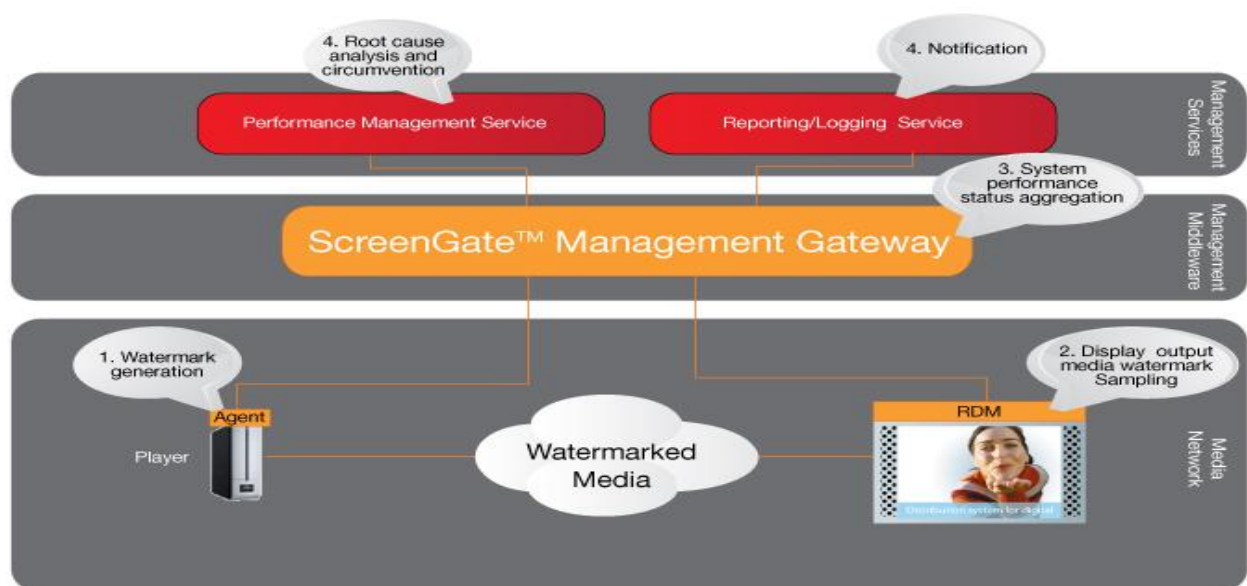


Fig 7: SMG provides a link between the physical network and the monitoring and reporting services, allowing complete end-to-end delivery verification

To circumvent player issues, the Management Gateway enables remote player switchover in the event that a player becomes unavailable, enabling continuous playback for maximum system uptime.

When integrated with an NMS system such as Nagios (figure 8), the ScreenGate™ Management Gateway enables a full end-to-end monitoring solution, featuring advanced management services such as graphical system view, mobile notifications and advanced reporting.

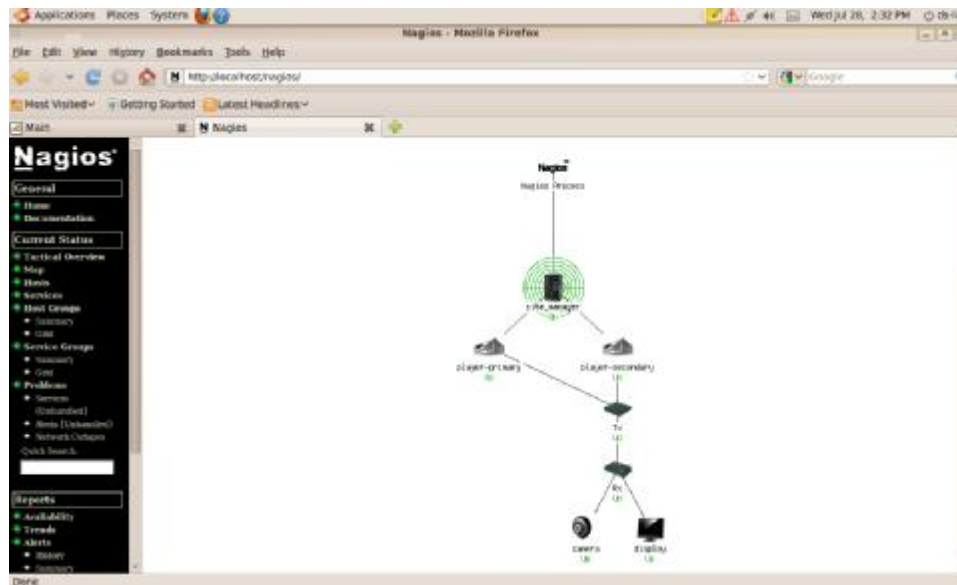


Fig 8: The Nagios monitoring service shows a system monitor snapshot based on the information collected by the ScreenGate™ Management Gateway.

VIII. Summary

The correct choice of management system will inevitably determine the reliability, success and profitability of a digital signage network. The ideal system will include easy-to-use functionality that abstracts the management and detail of the physical network from the business processes the network is designed to serve, allowing the organization to focus on what the business does rather than how the business does it. It will deliver robust tools for managing the network and share these among relevant services while maintaining central control in order to ensure consistency of operation. The optimum management system will be architected in such a way that the impact of change – whether to the network or the devices attached to the network – is negligible and transparent to the user and the services. And finally, it will deliver absolute verification of media display, together with the ability to remotely identify and circumvent issues.

A management system that achieves all this will deliver substantial business benefit in terms greater efficiency, reduced cost, higher uptime, improved customer satisfaction, enhanced network value – and superior ROI.

IX. Call for Action

To learn more about Minicom Digital Signage Management solutions, please contact mds@minicomds.com