



## NetGain Enterprise Manager™

### Intelligent Appliance Based Enterprise Management Solution

## Enterprise Support Demands

Businesses are leveraging information technology to gain and maintain a competitive edge, while efficient support of the IT infrastructure poses a real challenge. The IT infrastructure managers of today are facing increasing demands to deliver new systems, services and applications, while the deployment of each new technology is adding to the complexity of the enterprise support model.

To effectively manage the IT infrastructure, enterprises require a support model managing the network, systems, services and applications. The complexity of the enterprise support model has manifested itself as the prime concern of the IT managers. The IT infrastructure managers realize the burgeoning need of a simple approach to the complex enterprise management solution involving quick-to-deploy tools that provide real and immediate acceleration towards to their business goals.

## Management Tools

The infusion and proliferation of new technology must be supported by an integrated reliable management tools to achieve desirable business benefits, control costs and ultimately avoid IT failures. The management tools are needed not only to understand and monitor various technologies but also how these technologies can be effectively implemented to achieve business goals.

The management tools would help the managers to view the entire IT infrastructure as an integrated whole and make useful information for infrastructure management readily available across the enterprise.

The tool set for IT managers would typically provide for

- continuous and real-time monitoring of systems, services and applications; report generation on health of the infrastructure
- flexibility to add new services and technologies
- notification of service level or device faults
- initiation of problem resolution; knowledge-base to advice on problems; Identification of root cause

- workforce co-ordination; problem assignment

The above mentioned tool-sets would value-add to their service delivery to:

- Reduce costs
- Improve systems, applications, services, databases and network availability
- Continuously improve on quality and business process
- Sharpens competitive edge; while providing access to advanced technologies
- Achieve best-in-class standards

## Intelligent Management Appliance

Taking the out-of-the-box concept to the next level, NetGain Systems introduces NetGain Enterprise Manager™, a network appliance-based solution for integrated management of network, services and applications.



### NetGain Enterprise Manager™

The current generation of enterprise management solutions can be broadly classified into:

1. Central server based management with autonomous agents: Higher cost, high scalability. Upgrades performed on central server, which can be expensive hardware/server and software upgrades.

2. Thick agents: Resource intensive agents. Lower cost, but have limited scalability. Requires individual upgrades on each agent.

NetGain Enterprise Manager™ provides an appliance oriented enterprise management solution that offers central server based management. It provides integrated support of the hardware and software, while driving the cost per agent to comparable to that of thick clients while maintaining the advantage of central server based management. The central server provides completely web-based secure and integrated management anytime from anywhere.

## NetGain Enterprise Manager™ Architecture

NetGain Enterprise Manager™ architecture is based on carrier-class, component-based, highly scalable architecture.

The system architecture with a central software integration bus makes it possible to have well integrated but loosely coupled software components which are robust, independent and distributed in nature.

The central software integration bus allows additional, distributed and independent software components to be easily 'plugged-in' to the system. The distributed design allows the scalability of the solution as the network expands and new services are introduced.

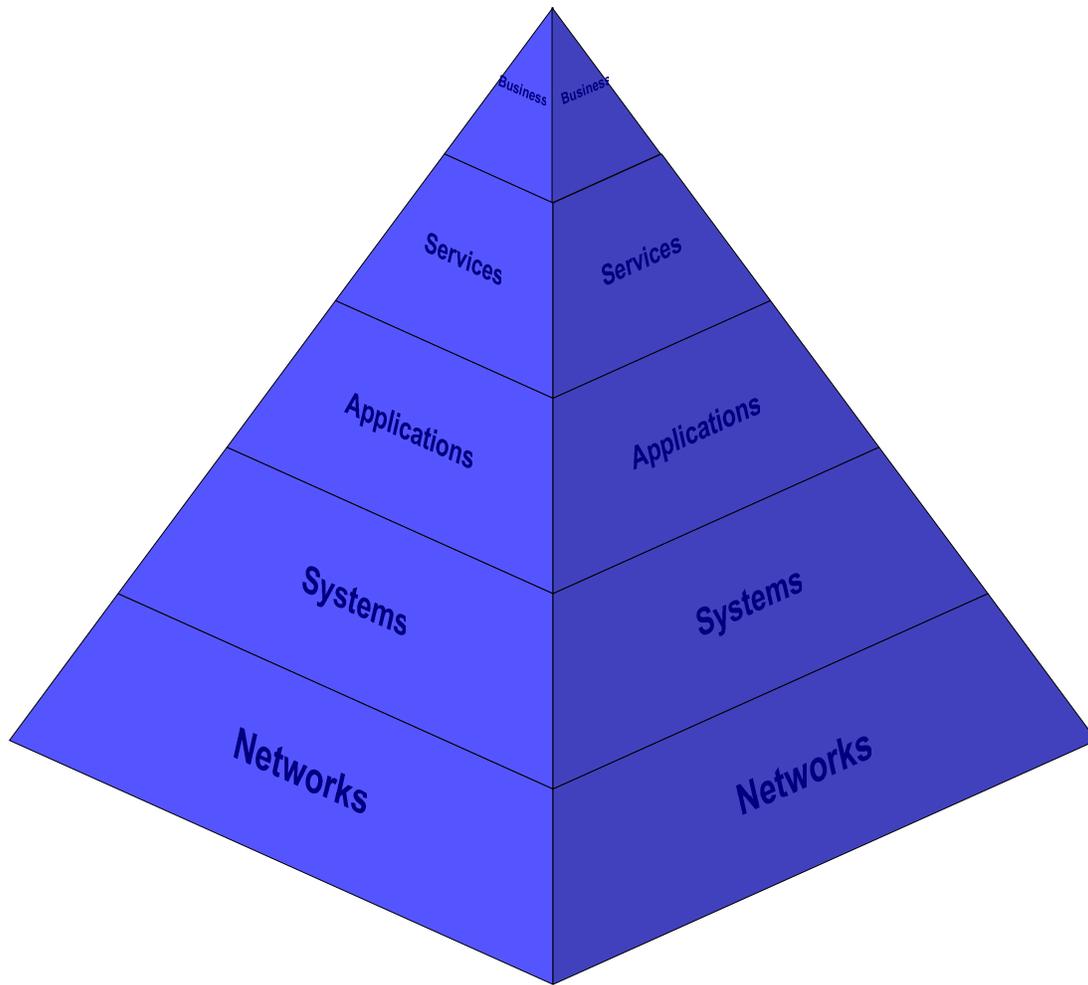
## End-to-End Management

End-to-end management across multiple components in a distributed heterogeneous environment has emerged as a requirement in infrastructure management. It is no longer viable to manage individual systems, computers, subnets and networks services in isolation. These components inter-operate to provide connectivity and services.

The customer oriented point of view goes through the boundaries of network, services, applications and their performance and service levels. The management tools must provide for end-to-end management across the different management layers.

An end-to-end management solution:

- Provides a strategic solution covering management of all critical components of all services
- Simplifies and improves setup, deployment, monitoring and measuring of services for faster ROI
- Allows to manage enterprise services based on business priorities
- Maximize service availability, keeping services fully operational on 24 x 7 x 365 basis to satisfy customers and protect revenue
- Keeps service delivery costs under control



Hierarchy of end-to-end management layers

## Proactive Monitoring

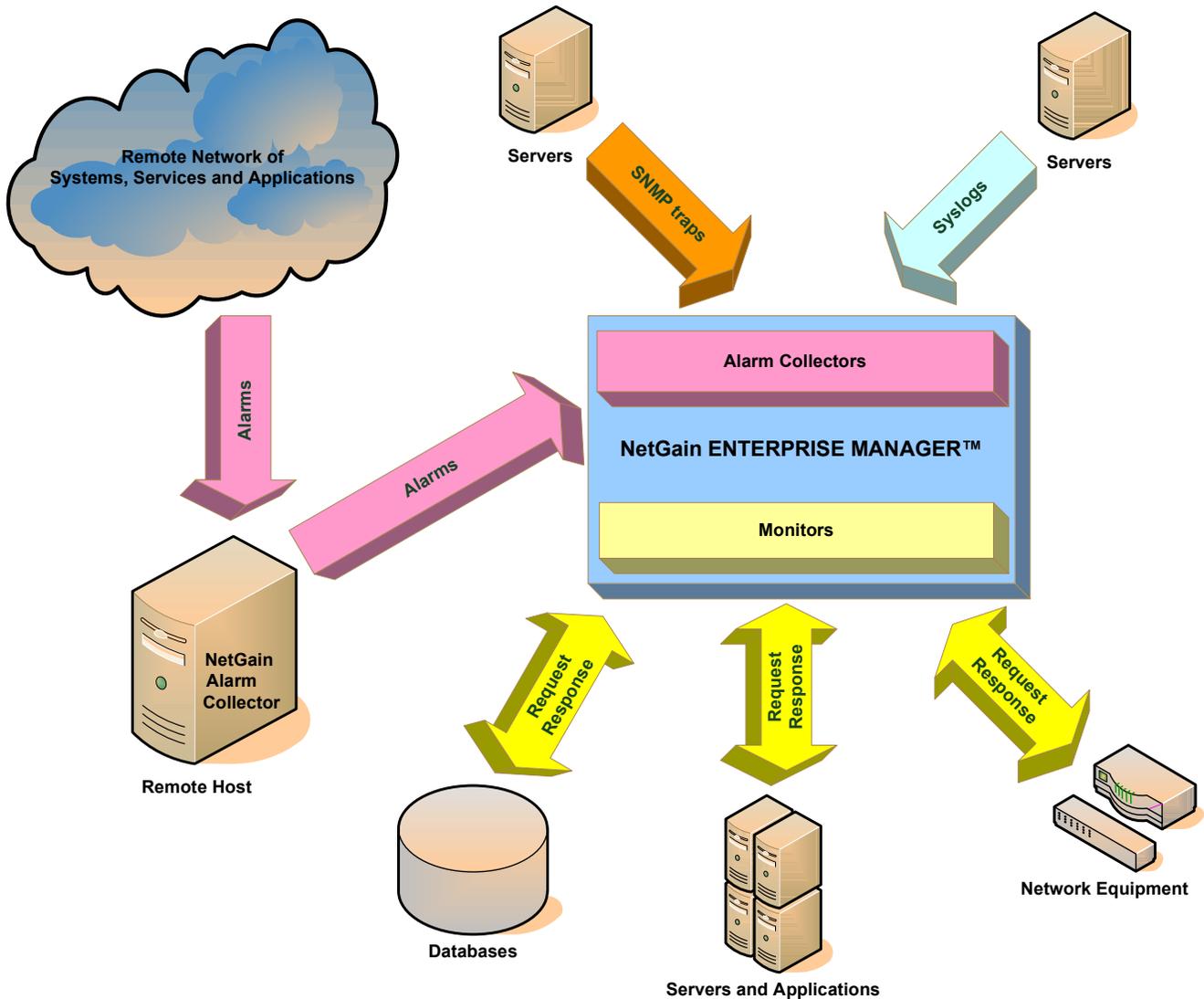
### Lightweight Monitors & Collectors

NetGain Enterprise Manager™ performs data collection for service level and performance monitoring through a wide variety of lightweight monitors and collectors. The collectors and monitors collect fault and service level information from a wide range of devices, databases, logs and other sources.

The collectors can be deployed virtually anywhere, allowing you to collect alarms from remote sites and different locations, behind firewalls etc. The collectors enable unified alarm management by converting different types of alarms from disparate sources such as SNMP Traps, Syslog etc into unified X.733 standard alarms, containing all the information provided by the native alarm.

## NetGain Enterprise Manager™ – Technical Whitepaper

The monitors pro-actively collect performance and availability data from a wide range of managed environments spanning across systems, services and applications, periodically and calculate the service, and if necessary trigger service level alarms on impending service disruptions.



Types of Monitors and Collectors

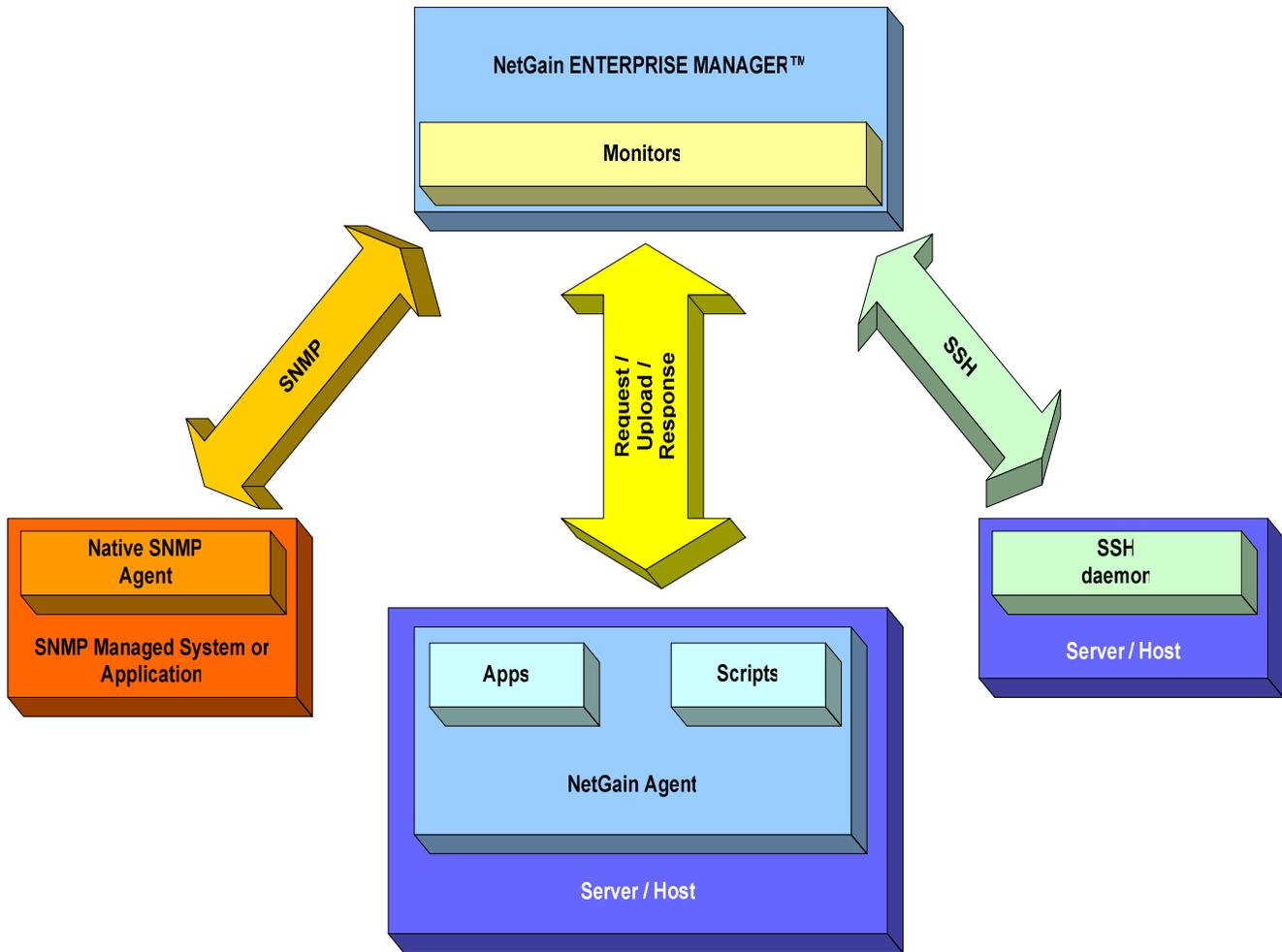
### SNMP, SSH & Agent

A wide range of monitors collect the necessary data via the following methods:

- **SNMP:** The monitor request necessary data from the native SNMP agents of the managed devices or applications, such as routers, databases, computers etc.

## NetGain Enterprise Manager™ – Technical Whitepaper

- **NetGain Agent:** The necessary data can also be requested from lightweight NetGain agents installed on remote servers/hosts. These agents can be used to get specific or custom data such as application outputs, results of scripts etc, securely.
- **Secure Shell:** The monitors can also use secure shell method to access the required data.



Monitoring methods

### Management Scope

NetGain Enterprise Manager™ helps to manage a wide range of environments and technologies, including network-based or internet-based devices and services, computing platforms, systems and servers, applications and services.

- **Networks**
  - Network devices *such as routers, switches, modems, etc.*

- Standard Network services such as RADIUS, Ping, Remote Ping, DNS, DHCP, DayTime, FTP, TFTP, etc.  
**Example:** Network interfaces: availability, input/output error rate, input/output utilization, input/output discard rate, input/output error rate, input/output packet rate etc.

- **Systems**

- Unix-based hosts such as Linux, Sun, AIX, HP-UX  
**Example:** CPU utilization, Memory utilization, Disk utilization
- Windows servers and clients
- Database servers such as Oracle, Sybase, Informix, MS-SQL etc  
**Example:** Cache hit ratio, Transaction rate, Network read/write rate, User connections, Tablespace/database utilization etc.
- Firewalls
- E-mail servers such as MS Exchange etc.

- **Applications**

- Application servers such as Apache Tomcat, Web Logic etc.
- Middleware

- **Specific in-house Applications**

Along with the out-of-the-box provided functionality and management scope, it is modular and flexible enough to extend to new technologies, services and applications, by introducing custom-made plug-in modules, when required.

## SLA Management

The IT infrastructure managers would need the systems, services and applications in an enterprise to perform at an acceptable level and provide the required functions or services at a perceived service level considered to be satisfactory. To quantify and measure the acceptable and satisfactory levels of service and performance would greatly enhance the IT manager's view of the health of their infrastructure as well as their customer's perception of their services. By getting to know the up-to-date system health and customer's experience of their services the IT managers can protect revenue and enhance customer satisfaction.

The Service Level Agreements or SLAs of systems, services and applications in the enterprise help to define the acceptable levels of availability, performance and service levels. The SLAs could be agreements between the enterprise and the customers or could be the expected behavior for disruption-free IT operations.

NetGain monitors help to ensure the SLAs are being honored while reflecting the real-time performance and service level status of the device, service or application it is monitoring. A monitor's SLAs are defined by their

- Monitoring parameters
- Service level criteria.

The parameters of a monitor include:

- Status of monitoring: enabled or disabled
- Monitoring interval between two discrete measurements
- Timeout for a discrete measurement to be considered a failure
- Retry attempts to be made
- Any other parameters specific to the monitor, such as IP address or port number etc.

The service level criteria specify:

- Rules for unacceptable values of measured parameters
- Service level agreement (SLA) thresholds, such as SLA warning threshold and SLA violation threshold.

A monitor can measure multiple parameters for a single measurement. The rules of unacceptable values of these parameters specify whether the measured set of parameter values is unacceptable. If the parameter values are unacceptable, then the single/discrete measurement is considered a failure.

The SLA thresholds define the percentage of failed single/discrete measurements over a specified period of time. The status of service level of a monitor can be in good, SLA warning or SLA violation over a specified period of time, based on these thresholds.

**An example:**

*Consider a Web site URL monitor. The single parameter 'Response time in milliseconds' can be used in a rule, specifying the unacceptable values, such as:*

*Response time greater than 10,000 milliseconds = unacceptable*

*Let us specify that 50% of failed measurements lead to service level violation over any specified time period.*

*Therefore, in a day if there are 48 measurements, once every half an hour, then if 24 measurements or more fail, then the monitor is in SLA violation status.*

*Similarly, in a hour if there are 2 measurements, once every half an hour, then if 1 measurement or more fail, then the monitor is in SLA violation status.*

## Event/Alarm Correlation Engine

NetGain Enterprise Manager™ provides unified management of alarms from various disparate sources such as devices, services and applications. The fault information in alarms are put through an intelligent set of correlation rules to suppress redundant information, isolate and quickly identify and resolve cause of the problem.

The alarm correlation rules are applied to each alarm to be propagated with regards to other alarm information as specified in the rules. The supported correlation rules are:

- **Alarm root cause rules:** This rule defines the relation of a root cause object's alarm to the dependant object's alarm in a time window. We can define such rules for well known dependencies, such as a web-server and a web-site. If a root cause alarm arrives prior to the dependant alarms, the dependant alarms are not propagated till the root cause is fixed within a time window. This behavior could help to quickly identify the root cause, while helping to focus away from the dependant alarms.

*Example: If a Web-server is down the Web-site would be down as well. Therefore if a root-cause alarm 'Web-server down' is present within a reasonable amount of time prior to the arrival of 'Web-site down' alarm, then the 'Web-site down' alarm is not sent.*

- **Alarm threshold count rules:** This rule specifies the threshold value of the number of times a particular type of alarm should be allowed to propagate. Basically this rule helps to suppress 'alarm flood' or repetitive alarms of the same type from the same source.

*Example: There could be a device or service, such as a communication port which would send multiple similar alarms repeatedly every few micro-second on an existing error. The threshold count rule can help to de-duplicate the multiple alarms and present them as a single alarm if they arrive within a given time window, say a second.*

- **Alarm transient correlation rules:** These are intended for a flood of alarms that notify a changing attribute, for instance state of a device. The attribute's final value is considered while ignoring the transient values using this rule, over a specified time window.

*Example: If a state of a communication port changes very frequently,, say every few micro-seconds, it could send a changing status signals as alarms. The transient rule helps to receive the final status during a given time window, say a second.*

## Inventory Management

Effective IT infrastructure management practices need accurate physical inventory, due to the fact that knowing what we have is necessary to plan to manage and control the assets effectively. The asset management practice can only succeed if the underlying asset repository is accurate and it must be maintained and validated by periodic checks on the physical inventories or over time the repository will become inaccurate. Experience shows inaccurate asset repository can be worse than no repository

since users can make important decisions based on very flawed data.

NetGain Enterprise Manager™ keeps track of the managed devices and related inventory, through a process of auto-discovery and inventory query. It helps to periodically check the physical and logical assets while being able to query and classify by their types and sub-types.

The auto-discovery process helps to populate the inventory database with up-to-date information on devices, their attributes such as:

1. Operating System
2. Attributes, including SNMP attributes
3. Services
4. Devices installed on the host
5. Processes running on the host
6. Software installed on the host

The users can perform inventory queries based on the types and subtypes of resources such as:

1. Network routers
2. Network switches
3. Network bridges
4. Computers
5. Performance monitors
6. Operating systems
7. Protocol based devices
8. Categories
9. IP Address

The types of resources are further categorized and sub-categorized where necessary. The query results are provided with details of the resources such as services, monitors and other related objects.

## Automating Management Tasks

To increase business process efficiency, quickening the pace of information exchange and bridging the semi-automated and manual tasks becomes an utmost priority. For instance, routine IT infrastructure issues such as notifications could be automatically generated, assigned and sent to the responsible groups or individuals swiftly. The automation should be flexible enough to be adjusted and introduced into the system efficiently with minimal delay.

NetGain Enterprise Manager™ provides very flexible automation framework to trigger various tasks on incoming fault or service level information. It is direct result of integration and sharing of real-time information in a common model across the components.

### Notification

Each user with a user account in NetGain Enterprise Manager™ can create rules to specify various ways of notifying himself about creation or changes in the status of SLA, and alarms. Such notifications can be in the form of e-mails, SMS, popup-window or sound.

Auto-actions on alarms can be configured to be executed when an alarm is generated in the system. The auto-actions that match the 'Filtering Criteria' will be invoked for each alarm generated.

The different types of alarm auto-actions are:

- Script auto-action: a specified script is executed.
- Acknowledge auto-action: the alarm is auto-acknowledged and assigned to a specified user

## Key Differentiators

### Integrated all-in-one functionality

NetGain Enterprise Manager™ provides out-of-the-box integrated functionality spanning across inventory management, fault management, topology management, and performance and SLA management, using shared information and data model.

The integrated functionality enables faster and more efficient information sharing across the various functionalities which in-turn would make end-to-end automation affordable and immediate reality. Automation combined with faster and more efficient information sharing can help to meet the critical business goals such as to reduce cost, increase efficiency, reduce service time-to-market, accelerate time-to-revenue, ensure quality of service and guarantee customer satisfaction.

The cost to integrate products addressing different functionalities, such as inventory management, service level management, fault management etc., is eliminated. Even in the integration of best of breed products, the format differences, content duplication and mismatches in files or database entries create a significant bottle-neck in both performance and information-flow.

### Quick installation & deployment

The network appliance concept enables NetGain Enterprise Manager™ to be rapidly deployed without any installation hassles and requirements. It can be mounted in a rack and hooked onto the LAN, while the users can login and perform their management tasks, including configuration through their favorite web browsers.

Typical turn-around period of deployment, installation and basic training such that users could perform basic management of their network, services and application could be expected to be a matter of a day or two.

### Ease of learning and usage

The system is presented in an intuitive and user friendly manner, while the usage and user interface has been designed to have a very quick learning curve.

Traditionally complexity of usage means increase of cost for training as well as the need for trained man-power. While maintaining the simplicity of usage with a simpler façade to complex problems, NetGain Enterprise Manager™ provides a simple and easy solution for non-experts to manage the system at the level of a true expert.

## Conclusion

NetGain Enterprise Manager™ is a unique network appliance based enterprise management solution that offers out-of-the-box integrated management of network services and applications, with holistic support of the hardware and software areas of the solution. It provides a wide range of integrated functionality spanning service level management, topology management, alarm management and inventory management and helps to automate tasks with shared data and up-to-date information.

The modular and flexible architecture and central server concept helps the solution to meet the growing needs of the IT infrastructure by making upgrades and maintenance hassle-free. With its rapid deployment and ease of usage it promises faster return on investment, while keeping the cost low per managed system. The integrated end-to-end management of service delivery infrastructure would certainly help the enterprise towards achieving its business goals.

## Contact Us

If you have any queries regarding NetGain Enterprise Manager™ or the information presented here, please contact us at:



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