

The Open Source IT Management Platform

Background: IT Management is critical to managing the complexity of networking equipment, computing systems, infrastructure software and applications. Increased adoption of low cost Blade Servers, Virtualization, and Service Oriented Architectures only serve to add to the burden of operating these complex systems efficiently and cost effectively.

There are two current problems. First, the cost and complexity of adopting IT Operations Management solutions puts it out of reach for many users. Second, there is often no way to “see” across level of the stack – in other words, to correlate what is happening between networking equipment, operating systems, databases, middleware and applications.

This paper will discuss the following topics:

- Market Need for an Open Source Platform for IT Operations Management
- The Hyperic Open Source Platform
 - o Overview
 - o Background
 - o Open Source Community
 - o Technology
- Hyperic Business Model
 - o Partner Ecosystem
 - o Hyperic Subscription Offering for Critical and Enterprise Adoption
- Market Positioning

The Market Need for an Open Source IT Operations Management Platform

IT Operations departments have two basic choices for general management solutions – the Big 4 Framework vendors (HP Openview, IBM Tivoli, CA Unicenter and BMC) at the high end and, at the low end, a variety of low-level scripting tools that have sprung up either in-house or as open source projects. This leaves a vast unfulfilled need in the middle – users that can not afford the cost or complexity of the Big 4, and those who simply need more or do not have time to make scripting tools work for them across all of the managed environments.

The open source development and community process seems well suited to the management space. Not only does it provide free software, it provides a mechanism for users to customize it to their specific environment. In addition, the idea of any one company developing the massive number of plugins [on Hyperic site, we used “plugin” without a hyphen. Either is fine, but should be consistent.]and maintaining them over time is solved by the community biting off small, digestible chunks like a plugin for a certain device or application.

The issue with the management space, however, is that there are a set of hard problems to solve to create a platform that can address a wide set of needs and still allows a community of plugins to be easily developed and co-mingled. These hard problems include:

- A central server that is scalable
- An agent architecture that can survive down-time and limited connectivity
- A scalable data schema
- A normalized data schema that can help with correlation between different components being managed
- A multi-user portal to access and use the information being collected
- A robust set of tools to monitor and create alerts
- An open plugin architecture
- The ability to be easily installed into very diverse environments and auto-discover the elements that are available and running

Open source projects are typically started by an individual or a small set of people that do not have the time to put such an architecture and implementation together. So open source projects typically focus on a more limited problem set.

Hence, there is still an opening in the market for a real IT Operations Management Platform with an open source implementation. The promise of this implementation offers a number of advantages. Certainly the “free” aspect is easy to understand – enabling tools to be used where it was impossible to afford the commercial alternatives in the

market before. In addition, there are a variety of other advantages because of the typical need to customize a management solution:

- Customized Needs
 - Custom Plugins for Applications
 - Custom Alerting, Reporting and Correlation
 - Custom Control Responses
 - Custom Integration with Big 4, other Open Source

As is evident from this list, there are a variety of ways that users want to customize their management platform. Open source is a huge facilitator of this. Think of the power of a large community of users building and updating plugins to hundreds of components at the network, OS, database, middleware, SOA and application levels.

Another powerful effect of an open source platform is the ease of access by ISVs and OEMs who would like to offer their customers access to management facilities for their products. With a free and open source management platform, all an ISV needs to do is create and offer a plugin for their application or device.

The same is true for Application Service Providers – or companies that offer Software as a Service. Having services provided by another company sometimes actually increases the need of users to have visibility into the operation of the service.

Hyperic – the Open Source IT Management Platform

In June, 2006 Hyperic officially announced that it was providing the Open Source IT Management Platform that meets the needs of the market described in the previous section. There are four primary drivers that make Hyperic the leading choice for users:

1. The Best Functionality

Hyperic is offering a comprehensive open source platform that provides the best functionality out of the box for managing IT assets. This includes:

- Auto-discovery of all IT assets
- Monitoring of all IT Assets across a distributed network
- Alerting on managed events
- Reporting in real time or based on historical archives
- Correlation across a variety of IT assets

Further, the Hyperic platform is a scalable, highly reliable and robust implementation. Agents can survive disconnection from the server and automatically reconnect and sync upon reestablishment of connections. The Server is highly scalable and able to handle literally thousands of servers and resources. The architecture is designed to do all of this with minimal (typically less than 1%) overhead.

2. Coverage Across the Entire IT Stack

The open source project comes with over 40 plugins assuring coverage across a wide range of IT resources, including:

- Network (Cisco, F5, Juniper routers, load balancers, switches, firewalls, etc.)
- OS (Linux, Microsoft, UNIX)
- Virtualization (VMWare, Citrix, XenSource)
- Middleware (JBoss, Websphere, Weblogic, .Net, Apache, Tomcat, LAMP)
- Databases (Oracle, SQL Server, MySQL, Postgres, etc.)
- Applications and Services (custom, MS Exchange, web services, etc.)

The capability to see across all tiers of the IT stack enables IT Operations to track problems to their source and to correlate across different technologies in a very cost effective manner.

You can clearly see the cross-platform and functionality in this chart:

Cross Platform	Inventory	Monitor	Event & Alert	Report
Network	•	•	•	•
Systems	•	•	•	•
Operating Systems	•	•	•	•
Virtualization	•	•	•	•
Middleware	•	•	•	•
Database	•	•	•	•
Applications	•	•	•	•
SOA Services	•	•	•	•

3. Open Architecture, Open Community

One of the key designs of Hyperic is a well-defined and open plugin architecture and development kit. This allows many plugins from diverse open-source committers to be used together on a common platform. In addition, the open source license has been clarified to ensure ISVs that they can develop a plugin without any fear of affecting their software license. This is meant to encourage the proliferation of plugins for a wide community effort.

Hyperic is run by open source experts. Doug MacEachern, the CTO, was one of the original 16 Apache creators and developed mod-perl. All of the members of the development team have contributed extensively to open source projects. They have taken their combined experiences in creating a web site that encourages the community to build on its own strength. This ensures a strong foundation that is governed by the open source license and the community.

4. Ease of Installation and Use

One of the key criteria to success of an open source project is how easily it can be adopted and spread. Hyperic has the best “out of box” experience of any of the

management products on the market – with most users getting real value in under an hour after downloading the software.

The Auto-discovery capability is a key feature that makes it easy to discover the manageable elements of an IT infrastructure – providing much faster out of box functionality than manually typing in configuration information and guessing at what is in the environment.

In addition, the well-documented plugin architecture (with over 40 plugins available in source code form) allows users to easily develop their own plugins for their specific environment or custom applications.

Hyperic Background

The Hyperic HQ product was originally built between 2002-2004 by Covalent with an investment of over \$12 Million and a team that was as large as 35 developers. This large investment is the core reason why there is an open, enterprise architecture for the product.

Hyperic, Inc. was formed in 2004 by the lead architect and key developers of the product while at Covalent and acquired from Covalent as the company was reorganized. Essentially Covalent V1 was split into Covalent V2 (focused on Apache Support) and Hyperic. These two successor companies were both formed as cash-based businesses and have been very successful by focusing on their respective strengths.

Hyperic focused on transitioning the product to be easily downloaded and tried by users so that the development team could focus on core development. The combination of robust architecture and the new focus of a smaller, more efficient team led to the product being positioned as the Open Source IT Operations Management Platform. This legacy gives Hyperic HQ the right combination of sophisticated features, open architecture and ease of use that have led to its success as its reputation spreads by word of mouth.

Open Source Knowledge

The core team at Hyperic is also well formed for the purpose of building a successful open source community. Javier Soltero, lead architect of the product and now CEO of Hyperic, was a very active member of several open source communities. In fact, he was an early user and contributor to JBoss as he saw the benefits of building Hyperic on an Enterprise Java foundation that allowed for scalability and easy cross platform. But the use of JBoss back in 2001-2002 required advanced users to be active community members, helping to build the code and fixing bugs.

Doug MacEachern, CTO of Hyperic, was one of the original 16 Apache members and is the author of `mod_perl`. Charles Lee, VP of Engineering, and other members of the development team, are all active contributors to open source projects and have excellent knowledge of the development and community building process. The engineering team is fully cognizant of and committed to encouraging a healthy and active open source community.

Business Background

The development team that acquired the product in 2004 needed to generate business but chose not to seek outside funding and focused instead on generating their own cash

flow for the business. The team has successfully built a customer base over the past two years, as well as signed important OEM agreements, including JBoss's decision to build the JBoss Operations Network on the Hyperic foundation. Deployment of the JBoss ON to hundreds of customers also helped to ensure the scalability, robustness and cross-platform capabilities of the core product.

The Decision to go Open Source

With the software proven and a base of customers using the product in production, it was time for the company to decide the next step in the evolution. With the heritage of open source in the company, the market dynamics providing a clear signal that the industry was moving to open source, and the fact there was simply no open source platform in the management space, the company decided to move in this direction.

The company put in place a set of advisors and financial backing to ensure the move to open source was a legitimate, whole-hearted effort. Larry Augustin (of VA Linux, Sourceforge, Slashdot fame, and also on the Board of JBoss, SugarCRM and a variety of other open source companies) and Bob Bickel (who helped build the Professional Open Source business model for JBoss) are both active advisors and coauthors of the business plan. Accel and Benchmark, two of the leading VC firms – both with depth and experience in Open Source – provided a Series A funding round. Other investors such as Stanford, Larry Augustin and Bob Bickel also joined in helping to fund the company to build out an open source community.

Community First

The business plan calls for focusing on building out the open source community as Priority One. The development team has been focused on getting the source code ready for sharing with the rest of the world. This includes the task of making sure the primary interfaces are all stable and provide a solid platform for others to easily add code and plugins. In addition, community interaction facilities like forums and email lists have been put in place to ensure broad and open communications.

Hyperic is committed to continuing to do development in this open environment and focusing on building the functionality in the Hyperic HQ Open Source Platform.

Since Management is such a broad term, we are also collaborating with other open source projects via the Open Management Consortium - <http://openmanagement.org/>. Hyperic is committed to using open source as a mechanism to advance standards in the management domain.

Technology

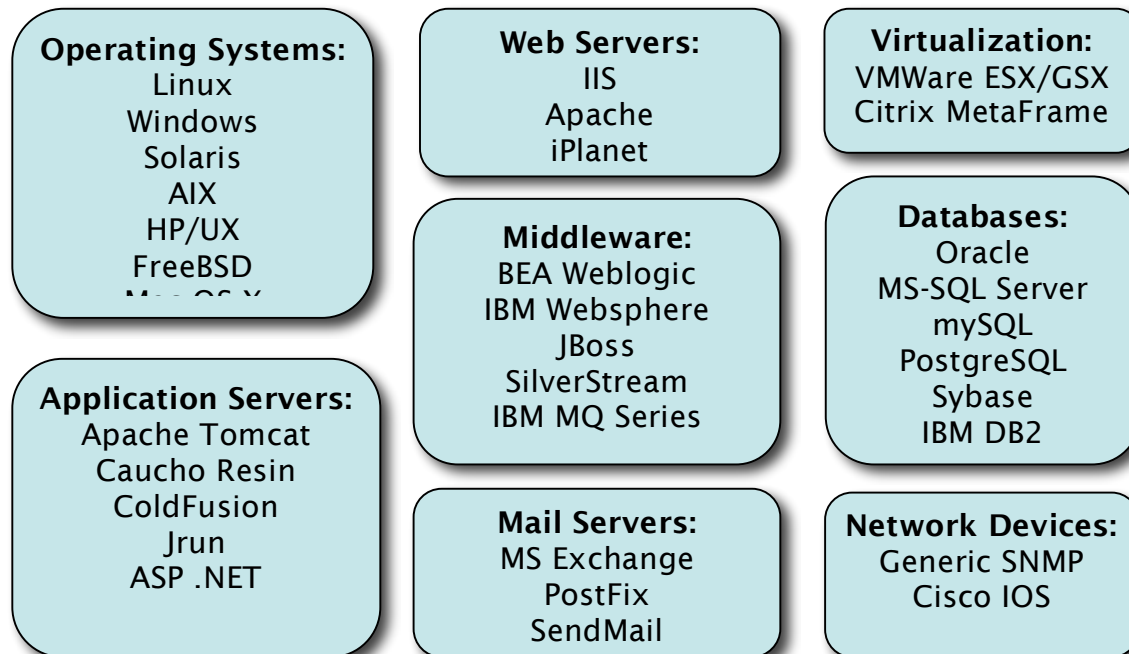
Hyperic HQ offers a rich set of IT Operations Management functions including Auto-Discovery and Inventory, Monitoring, Alerting, and Reporting across the entire IT stack of technology:

Cross Platform	Inventory	Monitor	Event & Alert	Report
Network	•	•	•	•
Systems	•	•	•	•
Operating Systems	•	•	•	•
Virtualization	•	•	•	•
Middleware	•	•	•	•
Database	•	•	•	•
Applications	•	•	•	•
SOA Services	•	•	•	•

Hyperic HQ has been in production use since 2003 and continually been updated with the latest technology. This includes updated support for plugins like WebLogic 9 or RHEL 4 as well as updating the functionality of the product to make use of new technologies like AJAX to allow for easier real-time reporting and interaction.

Plugins

One of the primary features of the product is its ability to monitor across a variety of technologies used in diverse user environments. The list of current plugins is constantly evolving as the community develops. The current list supported by Hyperic includes:



The plugin development kit makes it very easy to add new plugins for custom environments. This can range from adding new JMX resources to monitor in a Java environment to custom database queries generated by simple XML templates for monitoring key business metrics of an application like SugarCRM.

Fast Implementation

Hyperic HQ is designed to be very simple to download and install. It comes with everything that's needed to get it running. Once installed, Hyperic HQ will automatically do an inventory of IT assets and auto-discover hardware, operating systems, middleware, databases, etc. as well as begin collecting statistics.

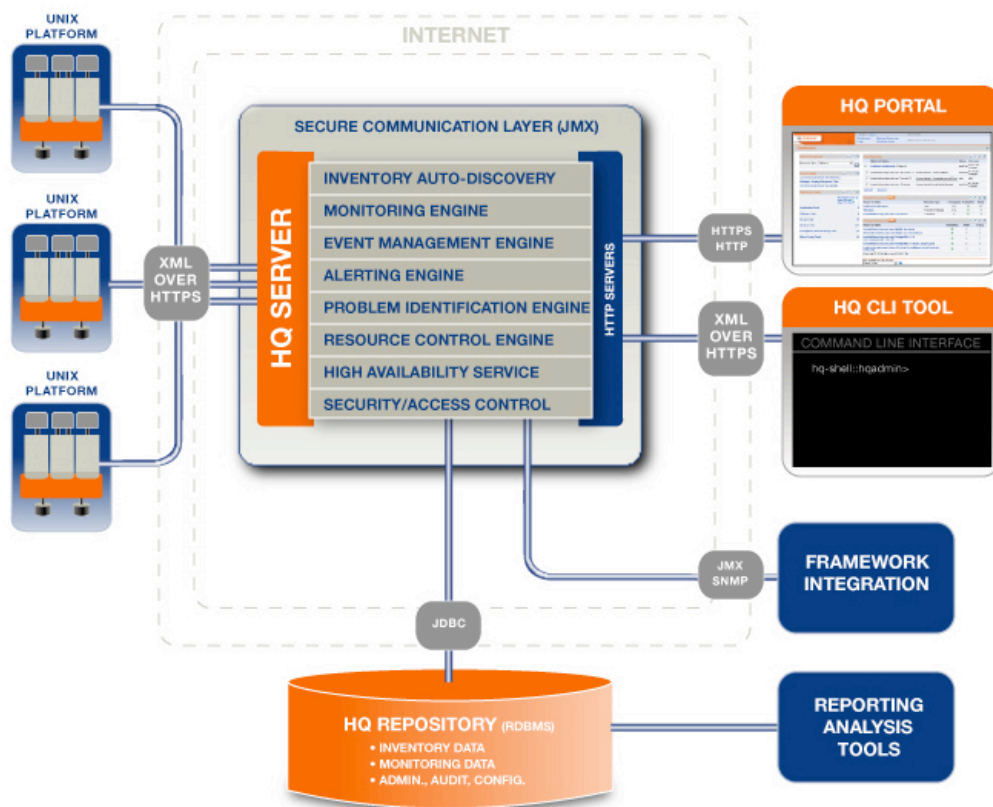
The user interface is an advanced, easy to navigate Portal that allows multiple remote users to access the management platform easily and securely. Advanced technology such as AJAX has been used to make the various charts and reports easy to interact with and customize.

Users can create custom views and monitor the assets and statistics that are important to them by simple point and click operations. There are no complex scripts to write. And the updates are saved in the portal for other users to access.

Advanced Server Architecture

The Hyperic HQ platform is built on a message bus (JMS) architecture using Java Enterprise Edition. This provides a very robust platform that provides scalability via clustering. Java allows this product to run across all platforms – Linux, Windows, and UNIX. In addition, adherence to standards ensures that users and the community are building on an open platform.

The Server is built on a modular architecture allowing advanced community members to extend the product's functionality.



Note that the platform has multiple interfaces for ease of integration:

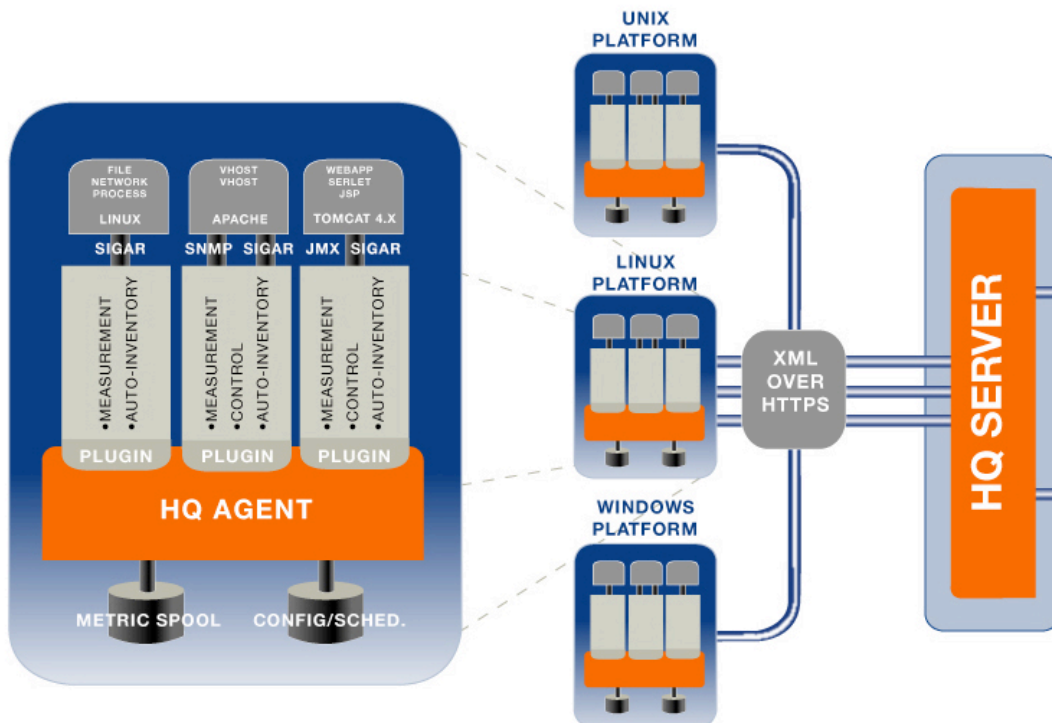
- Portal

- Command Line
- JMX
- SNMP
- Web Services

Essentially, all functions of the platform are open via any of these interfaces, providing for an exceptionally open base for customers with advanced needs. This also provides a very robust set of alternatives for the product to be integrated with existing scripting tools like Nagios, as well as larger enterprise frameworks such as Tivoli and OpenView.

Agent Architecture

The Agent is a cross platform facility that provides core communications and persistence services for interacting with managed infrastructure. Communications with the server are done over secure http, allowing them to pass securely thru firewalls and the support of a truly distributed network. The base agent allows for multiple plugins to run.



SIGAR (System Information Gatherer and Reporter) is a cross-platform, cross-language library and command-line tool for accessing operating system and hardware level information in Java, Perl and .NET.

SIGAR was developed by Hyperic to overcome the lack of portable access to low-level hardware and operating system metrics found in the Java platform. It is now a key component of the Hyperic HQ management platform since it provides HQ with visibility into things that are otherwise impossible to get to through the standard Java API.

Over the last two years of development, SIGAR has been enhanced to support multiple language bindings and operate on more than 10 OS/hardware combinations. We have decided to make this technology freely available for non-commercial use to give others the ability to write and enhance applications that would benefit from the type of information SIGAR provides. We also want to create and foster a community of users who will help us push this technology forward and incorporate it into both open source and commercial applications.

The SIGAR API and command-line tool provide access to detailed information such as:

- **System memory statistics** - total, free, shared
- **CPU statistics** - load averages, user cpu, system cpu
- **Process level statistics** - process arguments, memory consumption, cpu consumption, credential info, state, environment, open file descriptors
- **File system level statistics** - local and remote mounted file systems (NTFS, ext, SMB, NFS, etc), capacity, utilization
- **Network interface level statistics** - all available network interfaces detected and monitored for bytes received/transmitted, packets received/transmitted, collisions, errors, dropped packets

The SIGAR distribution includes the following:

- **SIGAR Native Libraries** (Linux .so, Win32 .dll, Solaris .so, AIX .so, HP/UX .so)
- **SIGAR Java bindings** (Packaged as a single .jar file)
- **Java source code** for common UNIX commands like top, ps, df, and others that show you examples of how SIGAR can be used, as well as provide cross platform versions of these helpful commands not typically found on all platforms.

- **SIGAR Command Line Interpreter** that allows you to interactively try the sample commands, as well as view an example of doing things like using SIGAR to build a cross platform command line shell with bash-like tab completion
- **Perl bindings** and examples which show you how to make the cross platform capabilities of SIGAR accessible to developers of Perl-based applications and components
- **C# bindings** and examples which work with both the Microsoft .NET runtime as well as the Mono .NET runtime.
- Javadoc Documentation (also available [online](#))

Technology Summary

As can be seen, Hyperic HQ is a significant contribution to the open source community with approximately 1,000,000 (One Million) lines of code. The fact that it is so easy to install, is completely cross platform, and has well-defined interfaces with the Plugin architecture make this a viable choice for any IT Operations organization looking for an Open Source Management Platform.

Hyperic Business Model

The Hyperic business model is based on several key success criteria:

1. Create a viable Open Source Community. The Hyperic HQ product lends itself to providing an open source community the technology it needs – cross platform, high functionality, easy out of the box, simple to modify and extend. Hyperic HQ offers by far the most functionality of any open source alternative in the market. The company wants to get the technology deployed as broadly as possible as FREE and OPEN SOURCE.

Hyperic HQ is licensed under the GPL – the most popular open source license on the market and the same license as Linux. We have added a GPL clarification so that plugins can be developed that will not impact the license choice of OEM's.

2. Establish a Partner Ecosystem. Hyperic, Inc. is reaching out to a variety of companies to encourage their use of the open source Hyperic HQ platform. Whether this includes redistribution, the creation of plugins, or the adoption by ISV's and OEM's of an integrated management solution for their customers – there are a variety of ways that others can benefit from the core open source platform and add value. There are a variety of companies who can benefit from bundling a specific version of Hyperic with their products to give their end customers the type of management capabilities they desire.

3. Enterprise Subscription. Hyperic will offer added value to the Hyperic HQ Open Source Platform via the Hyperic Enterprise Subscription for those users that have more advanced requirements. The Hyperic Enterprise Subscription includes:

- 8X5 or 24X7 Support
- Indemnification
- Extended Enterprise Features:
 - o Resource Control
 - o Role-based Security
 - o Log/Security Event Tracking
 - o Problem ID and Baselining
 - o High Availability

4. Training & Consulting. Hyperic will offer a variety of training courses for Hyperic HQ. Consulting will be available in only limited engagements, as Hyperic wants to encourage an ecosystem of partners to deliver the integration services that some customers will require.

Market Positioning

Hyperic is positioned to fill the gap between the Big 4 Management Frameworks and the various home-grown scripts that customers build for themselves. In fact, these various products will live in a co-mingled state in many cases.

Nagios has become a very well accepted open source product for monitoring. Hyperic works very well with Nagios – enabling customers to feed Nagios events into the Hyperic platform, and vice-versa. Hyperic offers customers the extra advantages of auto-discovery and inventory and extended monitoring, reporting and alerting capabilities. In addition, the cross platform support and in-depth middleware visibility give Nagios users an extended set of capabilities to add on top of Nagios.

Openview, Tivoli, Unicenter and BMC customers have typically invested tremendous resources into these frameworks. Hyperic is not meant to replace those products – but to extend the reach of use of those products in the areas of monitoring, alerting and resolution. Many companies cannot afford the broad deployment of commercial software, or there is a need for further visibility into the open source stacks (Apache, JBoss, MySQL, etc.) being used in companies that the broader frameworks do not provide. A number of customers use Hyperic for these areas, and then feed events up to the larger frameworks via SNMP, Web Services or custom CLI scripts.

Hyperic believes that Management is a multi-vendor domain. There are many areas of management such as Provisioning, Identity Management, Detailed Administration, Desktop Administration, Service Desk and Configuration Management that Hyperic does not address. This is why we are participating in the Open Management Consortium (<http://openmanagement.org/>) – to advance the cooperation between vendors and open source projects to meet the needs of customers.

Summary

Hyperic has provided the market with the Open Source IT Operations Management Platform. The combination of advanced technology, easy to use functionality, and an open platform provide a powerful new way of doing business in the Management space. Just like open source has changed the dynamics of the Operating System, Middleware and Database markets by expanding the field of users, and unlocking new levels of innovation and cooperation – Hyperic is bringing the same level of change to the Management marketplace.