



ZENPRISE[®] MOBILEMANAGER[™]

Technical Whitepaper

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Zenprise® MobileManager proactively troubleshoots and prescribes fixes to enterprise BlackBerry® problems. This allows enterprises to effectively handle the growth in BlackBerry users & services, without growing costs or compromising service levels.

THE PROBLEM: MANAGING BLACKBERRY GROWTH

The rapid growth in the number of BlackBerry devices in the enterprise is causing a unique support issues for messaging and IT groups. A recent Osterman Study¹ identified three key IT support challenges:

- Supporting High Profile Employees
 - 95% of executives and senior management use BlackBerry devices. These executives demand a high level of service from IT.
 - 63% of mid-level managers surveyed use BlackBerry devices, and more and more of their productivity is tied to having uninterrupted, mobile access to email and applications.
 - 50% of road warriors such as traveling employees and sales personnel use BlackBerry devices as their primary connection to the home office.
- Reducing Time Spent Troubleshooting
 - 80% of the time spent troubleshooting BlackBerry environments is around solving userrelated issues and fixing BlackBerry Enterprise Server (BES)'s interaction problems with the Exchange Server.
- Eliminating BlackBerry Downtime
 - 86% of the organizations surveyed reported average down times of 29 minutes every month. One in eight organizations surveyed reported down times of over 60 minutes a month. Down times are often unrelated to the BES server itself.
 - When faced with such down time, close to 50% of organizations surveyed reported a user productivity loss, with 25% of the organizations reporting a productivity impact of as much as 25 to 50%.

The Osterman study highlights two key facts about the use of BlackBerry devices: 1) that the primary users of mobile email require these devices to always work to be productive and 2) most of the problems aren't actually caused by the BES server or handheld devices.

The profile of the BlackBerry user population (mostly executives, senior management, middle managers, mobile users and sales personnel) and the rapid pace at which this user population is growing, necessitates investment in the right monitoring and management solution.

Organizations with growing BlackBerry user populations are constantly looking for ways to best meet Service Level Agreements without adding additional IT resources. Achieving this balance requires organizations to take a fresh look at the tools and methodology used by their support teams.

Zenprise MobileManager provides organizations experiencing growing mobile user populations with an automated mobile management solution. Zenprise uses proactive troubleshooting methodologies to isolate the root cause of problems in the underlying mobile infrastructure. This proactive troubleshooting ensures that high-profile users continue to receive a high level of availability and performance from their mobile service.

ZENPRISE PHILOSOPHY: PROACTIVE TROUBLESHOOTING

Traditional monitoring systems often generate a flood of alerts when key components of the BlackBerry infrastructure experience problems. IT administrators often spend valuable time sorting through these alerts in an effort to determine the cause of these symptoms.

A particular underlying root cause may manifest itself through multiple symptoms. Typical monitoring systems, in absence of any awareness of the underlying infrastructure, topologies, or applications, are prone to receiving a flood of alerts for the same problem. The problem is frequently made worse when IT administrators are either forced to ignore alerts to

¹ Issues in Using BlackBerry Enterprise Server in Exchange Environments, Osterman Research Report, May 2007.

varying degrees, or miss acting on an important alert because it is hidden amongst many other, seemingly less important alerts.

Zenprise takes a remarkably different approach to monitoring BlackBerry service availability, performance and integrity. Rather than generating an alert for each observed symptom, Zenprise uses its patent-pending ZenPro technology to group together different symptoms caused by the same problem. The software will then run a series of sophisticated troubleshooting tests to identify the root cause of the problem. Zenprise presents the administrator with a single root cause, rather than a slew of monitoring alerts. Additionally, customers receive detailed resolution instructions on how to fix the problem. The net result is up to a 95% reduction in the overall alert volume generated across the BlackBerry infrastructure, and a 60% reduction in the overall mean time to repair.

The Zenprise approach is proactive in nature, which is a stark contrast with how traditional monitoring systems work. Simple monitoring systems are generally reactive by nature—they're meant to alert IT personnel after particular conditions are met. As a result, the troubleshooting process is always initiated after users start experiencing a problem.

Zenprise enables IT organizations to manage their BlackBerry infrastructure proactively. Symptoms are quickly matched to Zenprise's problem signature database, and relevant troubleshooting processes are triggered automatically. An administrator is notified of the Root Cause often before users are impacted or report any issues.

This proactive troubleshooting ultimately improves overall services levels and keeps the down time to a minimum. This change in IT operations mode—from reactive to proactive—is the most important benefit of real-time automated troubleshooting, vis-à-vis traditional monitoring systems.

END-TO-END MONITORING OF BLACKBERRY ENVIRONMENT

No Configuration Required

Monitoring systems require intensive configuration efforts to define the environment and to identify what needs to be monitored. The driving principal behind

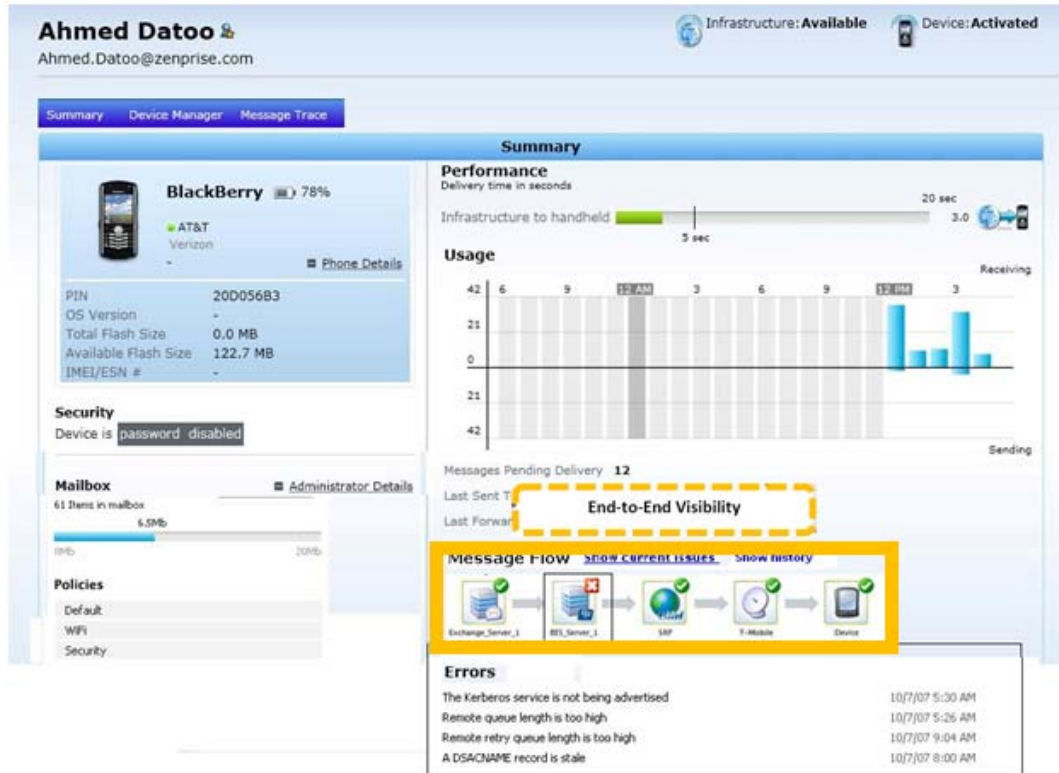
Zenprise's architecture is to provide a low-touch deployment and automated discovery. During installation, Zenprise Discovery performs an automated end-to-end discovery of the entire BlackBerry infrastructure. This information is stored in Zenprise's BlackBerry and Exchange Infrastructure Model. When changes are made in the environment (e.g., Exchange and BES servers are added or removed), Zenprise automatically discovers these changes and incorporates them into the Zenprise infrastructure model.

Holistic View of BlackBerry Environments

This end-to-end discovery allows Zenprise to automatically model and troubleshoot the entire BlackBerry environment, including:

- BlackBerry Enterprise Server (BES) servers
- SQL or MSDE databases used by BES servers
- Microsoft Exchange servers
- Active Directory Domain Controllers (DCs)
- Active Directory Global Catalogs (GCs)
- Associated RIM SRP network used by BES servers
- Carrier networks used by BlackBerry devices (e.g. Sprint, Verizon, T-Mobile, Vodafone Cingular, Rogers, etc.)
- BlackBerry devices
- BlackBerry-enabled users
- BlackBerry device configuration details
- Applications installed on BlackBerry

This end-to-end awareness of the underlying BlackBerry, Exchange, Active Directory, and network components, coupled with the RIM and carrier networks used, allows Zenprise to maintain service topologies unique to each BlackBerry-enabled user in the organization. For example, Zenprise understands that a particular user is serviced by BES server BES01, and that their mailbox resides on Exchange server EXCH01, which is dependent on Active Directory Global Catalog server GC03, and DNS server DNS04. Further, Zenprise also understands that the server BES01 is serviced by RIM's SRP network `srp.us.blackberry.net`, and User A's BlackBerry 8300 device is connected to Cingular's carrier network.



Visibility into RIM and Carrier Network Problems

Zenprise monitors a customer's entire WAN infrastructure, including the availability and connectivity to RIM's SRP network and carrier networks. This ensures that organizations do not waste valuable time troubleshooting their BlackBerry infrastructure components when the root cause of the problem is a carrier or SRP issue. Zenprise automatically runs troubleshooting tests to proactively detect and isolate SRP and carrier network issues. Sample tests include:

- Name resolution of SRP networks, including extensive testing of DNS servers
- Connectivity tests to SRP networks
- Synthetic transactions
- Mail delivery tests

ZENPRISE MONITORING EXPLAINED

Once the environment is discovered and mapped, Zenprise automatically collects a wide set of configuration and performance metrics for the various underlying messaging components. Data collected includes:

- Cross-Environment Performance Baselines
- System and User Performance Trends
- BES Application Log File Entries
- BES SNMP information
- Critical Windows Application and System Event Log Entries
- Configuration Abnormalities
- User Level Synthetic Transactions

Cross-Environment Performance Baselines

In many system environments, baselines are built by monitoring a single system or component. Zenprise, however, takes an end-to-end service-based approach to BlackBerry, which encompasses all of the BlackBerry Enterprise Server's underlying components and dependencies. Zenprise builds cross environment performance baselines for a given set of BES servers, BES databases, Domain Controllers, Global Catalogue servers, and Exchange servers. Zenprise discovers changes to the topologies and automatically adjusts all baselines to enable proper detection of symptoms.

Dynamic Time-Sensitive Performance Baselines

One of the weaknesses of most monitoring systems is the reliance on static performance thresholds. For instance, administrators wanting to monitor load on a server's CPU typically set a static threshold – e.g. 70%. In this case, the monitoring systems will take frequent sampling of CPU utilization data from a monitored server, and alert the administrator when the threshold of 70% CPU utilization is met or exceeded.

However, the threshold of 70% by itself has little or no meaning. It lacks the context of time and possibly other related parameters, which can result in a flood of false positive alerts. For example, CPU utilization of 70% may be normal under certain circumstances, or during certain periods of busy activity like Monday mornings. To compensate for this and to avoid false alerts, the administrators may choose to use inflated threshold numbers. Raising the threshold value to a higher number like 75% or 80% only further decreases the effectiveness of such time-insensitive thresholds used by monitoring systems.

To better understand this, consider the following scenarios:

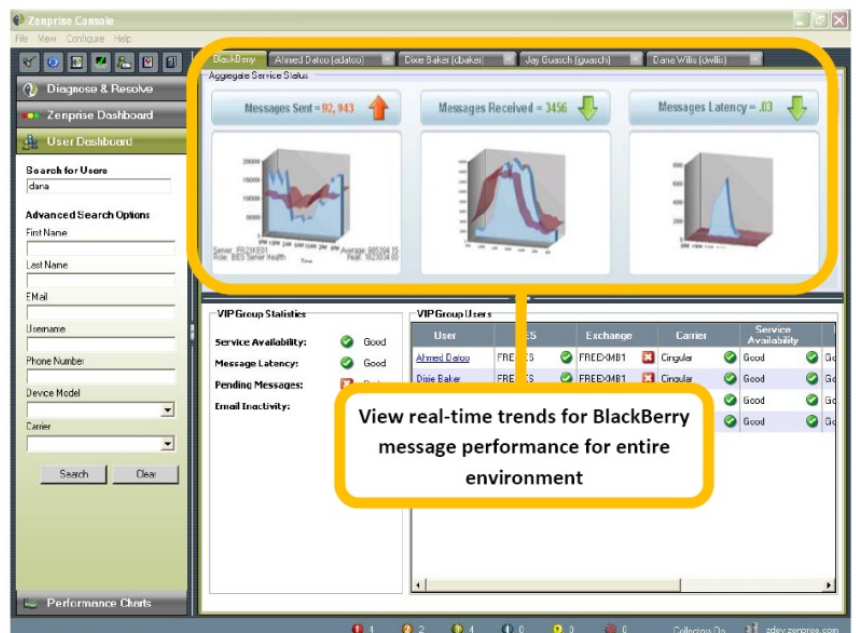
- 70% v/s 69.99%: Given a static threshold of 70% CPU utilization, monitoring systems will not generate any alerts till the threshold is met or crossed. In other words, CPU utilization of 69.99% appears to be perfectly normal, whereas an increase of .01% in CPU utilization will trigger an alert.
- Monday morning v/s Friday night: Another example of how static performance thresholds fail to address time elements is when CPU utilization of 69.99% appears as perfectly normal to most monitoring systems on a Friday night, a time typically characterized by inactivity. On a Friday night, CPU utilization of even 40 or 30% may be an indication of abnormal performance.

Zenprise introduced the concept of time-sensitive dynamic baselines to mitigate the problems created by setting arbitrary thresholds. By monitoring the actual performance of different systems in an environment during various periods, Zenprise dynamically builds a performance baseline that's time-sensitive and

therefore more reliable as an indicator of potential problems. This time-sensitive performance baseline allows Zenprise to adjust the server performance based on hour of the day, day of the week, week of the month, and month of the year.

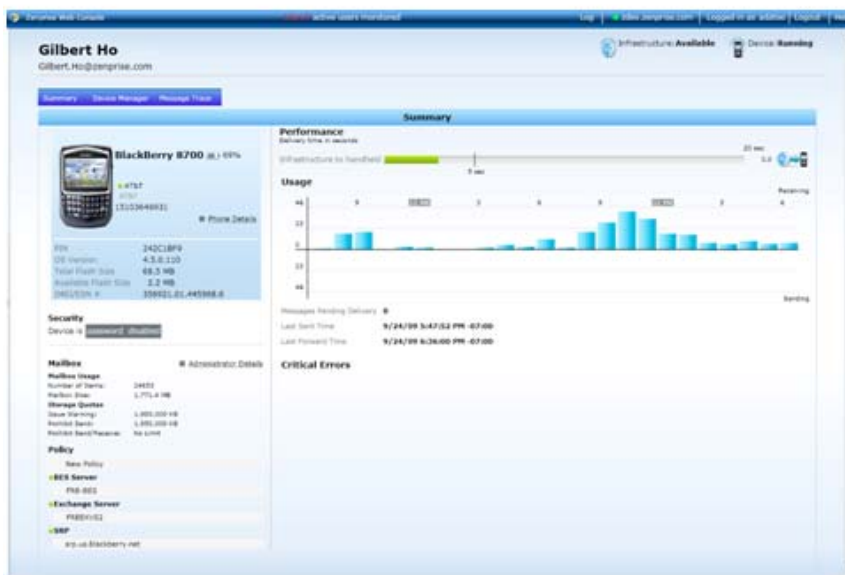
These baselines allow Zenprise to proactively detect end user availability and performance issues. For example:

- Messages pending delivery to BlackBerry handhelds: Zenprise might ignore a user's pending messages on a weekend because the user might turn their device off every weekend, but automatically investigate these pending messages on a busy period like a Monday morning.
- Message delivery latency: Message delivery latency is the time it takes for a new message delivered to a user's Exchange mailbox to be delivered to a user's BlackBerry device. Typical delivery latency differs from time to time, depending on a number of parameters, including BES server load, network conditions, carrier latencies, etc. Zenprise builds a baseline band of message delivery latency for different sets of users. This provides the ability to accurately detect abnormal message delivery times for a particular set of users relative to the time of the day.



System and User Performance Trends

The ability to discover the interconnected relationship between BES servers, BlackBerry databases, Exchange servers, Active Directory servers and the underlying network allows Zenprise to closely track and monitor performance for each system and user. Metrics such as mail delivery times can differ for each user based on a user's BES server, Exchange server, network route, carrier, device, etc. Zenprise automatically builds end-to-end performance baselines for each server and user. This rich performance base-lining functionality allows Zenprise to quickly detect when a given user or a set of users exhibit end-to-end delivery latencies or service disruptions.



BES Application Log File Entries

Zenprise closely monitors the application log files generated by BES servers. These log files contain frequently updated debugging information related to a BES server and its components, as well as information about different users being serviced by a given BES server. It is inherently unfeasible to manually monitor BES log files because of the frequent updating and the tremendous amount of data being added to the log files. The information contained in such log files is often cryptic, and administrators often need to analyze multiple log files across multiple servers to identify

meaningful troubleshooting information. Zenprise constantly monitors and analyzes BES application logs for signs of trouble. Information from BES application logs is correlated with symptoms seen not only on the BES server itself, but with symptoms seen across the entire messaging environment. The following example illustrates this concept.

Scenario – Hung MAPI threads from BES server to Exchange server: One of the causes of frequent service availability or performance degradation is the state of hung MAPI threads. MAPI threads are used by BES servers to communicate with mailbox stores on Exchange servers.

In instances of such hung threads, a certain set of users on the same Exchange server may experience service availability issues, whereas other users on the same Exchange server may continue to have access to services without any interruption or degradation.

Such complex conditions are automatically detected by Zenprise. Specifically, when new messages are delivered to a mailbox and queued by BES for delivery to the device, they show up as pending messages in the BES console. This generally indicates a service availability problem. However, with hung MAPI threads, a user's pending count might appear as zero, but the user still complains about not receiving messages

on their handheld. With hung threads, the BES agent never processes new messages, and therefore those messages do not show up as pending in the BES console. The following is how Zenprise proactively detects such an issue:

- Zenprise identifies the Agent ID referenced in the BES database for users being serviced by the thread

- Messages in mailboxes of users being serviced by the agent are monitored for changes in MAPI properties. When a new message is detected by BlackBerry agents monitoring a mailbox, the message is queued for delivery and a MAPI property is added to it, indicating it has been processed by the agent and queued for delivery. Once a trend of messages with unaltered MAPI properties is detected, Zenprise concludes the mailboxes being serviced by the agent are possibly affected by the hung thread and are not getting messages delivered. This is often identified before an entry is made in the log file.
- Additionally, information about hung threads is detected from BES debug logs if it is logged, along with the BES Agent ID
- The administrator is alerted about the hung thread, the list of users impacted by the problem and provided step-by-step resolution instructions for restarting the BlackBerry Controller service.

BES SNMP Information

Zenprise uses SNMP to collect performance and configuration metrics exposed by BES servers. The following SNMP information collected from BES servers:

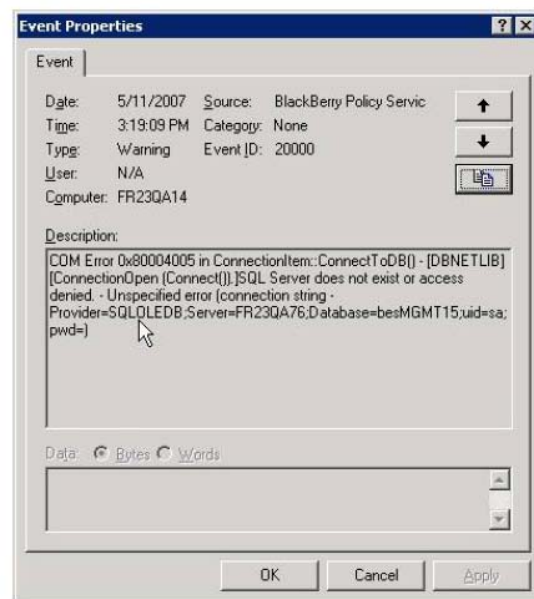
- BlackBerry Router: System configuration and health
- BlackBerry Dispatcher: System configuration and health
- BlackBerry Enterprise Server: System health & status
- BlackBerry Enterprise Server: SRP Connection
- BlackBerry Dispatcher connection to and from BlackBerry server
- BlackBerry Dispatcher connection to BlackBerry database
- BlackBerry Mobile Data System (MDS) Connection Service
- BlackBerry MDS Connection Service connection to BlackBerry database
- BlackBerry Messaging Agent

Configuration and performance information is collected from 26 SNMP objects from the BlackBerry Server-MIB.

SNMP Object Name	SNMP OID
BES.Config.ActualNumberOfAgents	1.3.6.1.4.1.3530.5.50.1.32
BES.Config.LicenceRemaining	1.3.6.1.4.1.3530.5.50.1.37
BES.Config.LicenceTotal	1.3.6.1.4.1.3530.5.50.1.36
BES.Config.LicenceUsed	1.3.6.1.4.1.3530.5.50.1.38
BES.Config.MaxNumberOfAgents	1.3.6.1.4.1.3530.5.50.1.31
BES.Router.SysHealth.DevicesConnected	1.3.6.1.4.1.3530.5.55.2.11
BES.Router.SysHealth.ServicesConnected	1.3.6.1.4.1.3530.5.55.2.10
BES.SysHealth.Cal.EventFromHandheld	1.3.6.1.4.1.3530.5.25.1.42
BES.SysHealth.Cal.EventToHandheld	1.3.6.1.4.1.3530.5.25.1.41
BES.SysHealth.Cal.UsersOTAC.Enabled	1.3.6.1.4.1.3530.5.25.1.40
BES.SysHealth.MDS.Connection.Failure	1.3.6.1.4.1.3530.5.25.1.71
BES.SysHealth.MDS.Connection.Success	1.3.6.1.4.1.3530.5.25.1.70
BES.SysHealth.MDS.TotalBytesFromDevice	1.3.6.1.4.1.3530.5.25.1.62
BES.SysHealth.MDS.TotalBytesToDevice	1.3.6.1.4.1.3530.5.25.1.65
BES.SysHealth.Msg.Errors	1.3.6.1.4.1.3530.5.25.1.27
BES.SysHealth.V1.MsgsPending	1.3.6.1.4.1.3530.5.25.1.202
BES.SysHealth.V1.MsgsReceivedPerMinute	1.3.6.1.4.1.3530.5.25.1.208
BES.SysHealth.V1.MsgsSentPerMinute	1.3.6.1.4.1.3530.5.25.1.207
BES.SysHealth.V1.TotalMsgsExpired	1.3.6.1.4.1.3530.5.25.1.205
BES.SysHealth.V1.TotalMsgsFiltered	1.3.6.1.4.1.3530.5.25.1.206
BES.SysHealth.V1.TotalMsgsReceived	1.3.6.1.4.1.3530.5.25.1.204
BES.SysHealth.V1.TotalMsgsSent	1.3.6.1.4.1.3530.5.25.1.203
BES.UserHealth.AverageLatencyPerMsg	1.3.6.1.4.1.3530.5.30.1.72
BES.UserHealth.LastInteractionWithDevice	1.3.6.1.4.1.3530.5.30.1.61
BES.UserHealth.NumberOfRedirectedFolders	1.3.6.1.4.1.3530.5.30.1.30
BES.UserHealth.Wireless.Email.RecoEnabled	1.3.6.1.4.1.3530.5.30.1.90

Critical Windows Application and System Log entries

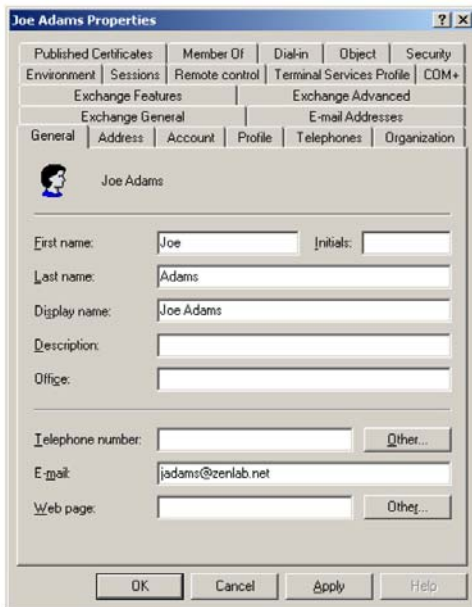
Zenprise closely monitors the Windows servers running the BlackBerry Enterprise Servers, Microsoft Exchange servers, Active Directory Domain Controllers, Global Catalog servers, and DNS servers. Critical events logged to the Application and System event logs are analyzed to identify root causes of issues impacting the overall BlackBerry service.



ZENPRISE TROUBLESHOOTING EXPLAINED

Know About User Problems First

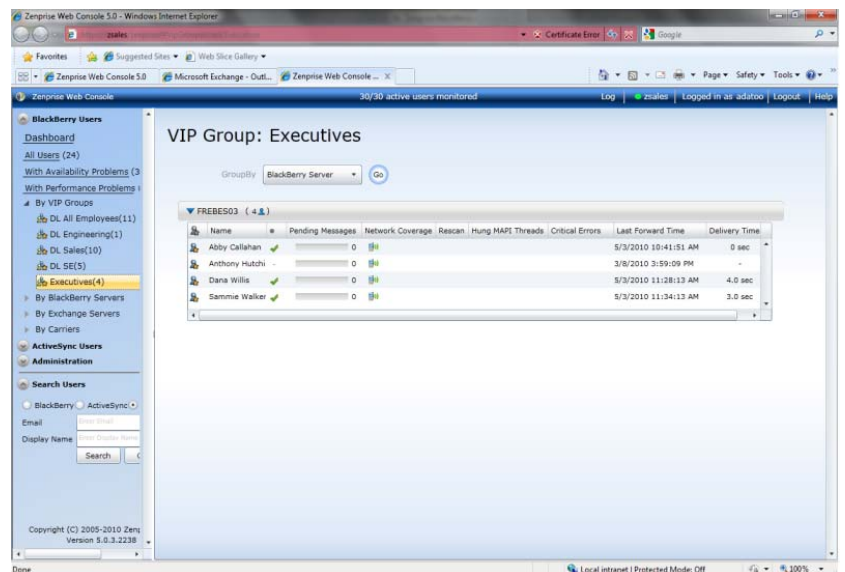
The Zenprise User Dashboard presents a quick snapshot of a selected user, including important user properties like email address, name of Exchange server hosting the user's mailbox, status of the particular Exchange mailbox database where the mailbox resides, details about user's mailbox quotas (if any), mailbox size and number of items, password policies and related information like last password change and time to password expiration. Such information can quickly rule out BlackBerry problems caused by mailbox quota limits being reached or caused by user password expirations. Analyzing such information would otherwise require an administrator to look in multiple consoles like Active Directory Users & Computers and the Exchange System Manager.



The User Dashboard also provides real-time infrastructure performance stats, such as latency between the BES server servicing the user and the user's Exchange server and message queues on the Exchange server. The dashboard also provides statistics pertaining to the user's BlackBerry device, including: number of messages delivered, last synch time, number of messages pending, number of

messages failed, number of messages expired, MAPI errors between the user's BES server and Exchange server. This information is collected from a number of sources – most static or relatively static attributes are stored in the Zenprise Infrastructure Model (IM), and real-time statistics use a combination of WMI calls to get performance counter information and MAPI calls to the user's mailbox to get BlackBerry related statistics. This real-time performance view of a user's BlackBerry environment helps support teams quickly isolate and resolve issues such as:

- BlackBerry device not reachable: When the number of messages pending delivery increases and considerable time has elapsed since last synch time
- Messages not being delivered over a period of time: The number of expired messages for the user is displayed in the User Dashboard
- New messages not being sent or delivered: When the server on which a user's mailbox resides shows high number of messages in local or remote delivery queues
- Communication issues between user's BES server and Exchange server hosting the mailbox: This condition can be quickly isolated based on the number of MAPI errors shown in the User Dashboard



Proactively Manage Executive BlackBerry Issues

IT administrators are constantly pushed to provide excellent service to executives or other high visibility employees. With this in mind, Zenprise created an Executive Dashboard to enable administrators to create a VIP list of their most critical BlackBerry users. Each VIP user displays a red/green status based on the overall availability and performance of their BlackBerry service. When message delivery to a VIP user's device is impacted because of problems affecting the BES server, the Exchange server, or the SRP network, etc., the Executive Dashboard flags the mailbox and indicates the problem. This provides a quick view of the status and health of VIP users' service, thereby enabling IT to proactively monitor and troubleshoot the user's BlackBerry service.

Proactively Troubleshoot Mail Delivery Problems

User level synthetic transactions are an important mechanism to determine whether a given BlackBerry enabled user mailbox is being serviced normally by BES server. Zenprise can perform synthetic transactions that mimic typical interactions between a BlackBerry device and a given set of Exchange and BlackBerry servers. These user-level transactions provide an important mechanism to ensure that mail is successfully delivered to the handheld. If mail delivery fails, an administrator can quickly identify where in the infrastructure the message is being held up (i.e., Exchange server, BES server, SRP network, carrier, or handheld).

The following synthetic transactions can run from the User Dashboard:

- **Ping Device:** This allows the administrator to determine whether they can communicate to the BlackBerry device. A positive response back indicates that the device is responsive and capable of receiving messages.
- **Send Test Messages:** Zenprise can send test messages to a BlackBerry device to validate whether the user can in fact receive messages to their handheld.
- **Continuous Test Messages:** Zenprise can send a series of test messages over a ten minute interval to measure overall delivery times. Such a test

effectively validates performance degradation experienced by end users.

- **User Health Check:** Over 100 automated diagnostic tests run in real time to determine the root cause to an end user activation, email, or calendar sync problem.

Automatically Troubleshoot Configuration Problems

The BlackBerry messaging infrastructure is dynamic — software, hardware, network topologies change frequently. Service packs, patches and hotfixes are constantly applied to operating systems and applications. Hardware and firmware configuration changes are routine. Network topology changes, including changes to connectivity, firewall access rules, etc. take place in most IT environments on a regular basis.

Traditional monitoring systems are not application aware and are not designed to analyze application configuration changes that can adversely affect availability and performance. Zenprise can proactively detect configuration abnormalities relative to a given topology. The following is a sample list of the thousands of configurations Zenprise analyzes:

- **BlackBerry Configuration Database:** Zenprise checks the BlackBerry database configuration for location of the database, checks SQL connectivity to it, and confirms that the credentials used to run BlackBerry services have authority to login.
- **Definition of a SRP network:** Zenprise checks that the server is configured to connect to a valid RIM SRP network, that the BES server can connect to the configured SRP network, and that the SRP network is available.
- **Hotfixes that can adversely impact performance or availability of BES**
- **BlackBerry Router configuration**
- **CDO versions across BES and Exchange servers**
- **MAPI profile configurations**
- **BES permissions:** Zenprise validates whether the BES service accounts have the appropriate permissions on the Exchange Information Stores hosting BlackBerry enabled user mailboxes.

Troubleshooting Knowledge Embedded

Zenprise maintains a symptom database that catalogues over 6,000 symptoms seen in BlackBerry and Exchange Server environments. This Symptom Database is seeded with knowledge from Zenprise's experts, company advisors, and partners (Zenprise embeds RIM and Microsoft knowledgebase articles). This database is seeded with problem signature files that detail the root causes and remediation instructions for thousands of symptoms.

Problem signature files are added regularly to the Zenprise Symptom Database, just like anti-virus and anti-spyware software. Zenprise servers update themselves automatically with new problem signature files, enabling Zenprise to detect and troubleshoot the latest customer issues from new hotfixes, service packs, etc. Consider the following examples:

- **Software Upgrades:** BES servers require the CDO.DLL file to be the same or a later version of the one on the Exchange server it connects to. It is not uncommon for an Exchange hot-fix to update the CDO.DLL to a later version, which creates problems if the BES server CDO.dll file isn't also upgraded in tandem. Zenprise sends updated problem signature files to customers whenever newly released Microsoft hot-fixes/service packs change this DLL. Automatic updates to the Zenprise Symptom Database allow customers to benefit from new information released by vendors like Research In Motion, Microsoft, etc., as well as by new problems identified by users, Zenprise customers, and Zenprise knowledge architects.

ZenPro Automation

Zenprise is a real-time platform, always collecting and analyzing symptoms. Every symptom type discussed in this white paper, as well as the baseline and predictive capabilities, feed the ZenPro automation engine. ZenPro takes symptom information collected from the environment and statistically groups the data into correlated symptom groups. This process can, in real-time, automatically group hundreds of monitoring alerts into a single root cause. ZenPro then runs diagnostic tests

to isolate the root cause of monitoring alerts. A critical difference with the Zenprise approach is that tests run proactively, before actual outages or performance degradations occur. Here is a small sample of the automated tests run by the ZenPro automation engine.

NETWORK & SERVICE CONNECTIVITY

ZenPro	Example Use
Ping	ping -t -a -f EXCH02
Traceroute	tracert -w 10 EXCH02
Nslookup	nslookup srp.na.us.blackberry.net
Service Port	telnet BES03 3101

BLACKBERRY-SPECIFIC

ZenPro Test	Example Use
Telnet	telnet srp.na.us.blackberry.net 3101
SQL	login to BlackBerry database
Latency	RPC latency between BES server and Exchange server
Expired Messages	Messages queued but not delivered to a device

ACTIVE DIRECTORY

ZenPro Test	Example Use
Test Active Directory Logon	ADTEST.EXE
Perform Address Lookup	LDAP Query
Check user's HomeMTA attribute	LDAP Query

These real-time diagnostics tests, in conjunction with correlated symptoms, speed problem analysis by pinpointing the underlying cause of a problem – often before degradations result in service outages.

Detailed Resolution Instructions

Don't Just See It, Solve It with Detailed Resolution Instructions

Once a root cause for a given symptoms is isolated, Zenprise provides resolution instructions for fixing the problem. Resolution instructions are detailed, step-by-step process flow charts that are customized to the user's environment (i.e., instructions call out customers' host names, configurations, etc. that are impacted). Zenprise constructs its resolution plan(s)

based on information provided by ZenPro, the Infrastructure Model, and the Symptom Database. The plans also display the related support knowledge-base articles written by Zenprise experts, or those available from vendors like RIM and Microsoft. This enables administrators to take corrective action quickly, without having to invest additional time in researching these articles on the internet.

Integrates into 3rd Party Infrastructure

Zenprise provides customers with pager and email notifications for all problems detected in a customer's environment. Additionally, Zenprise integrates well into existing IT helpdesk and trouble ticketing systems such as Remedy. Root Causes identified by Zenprise are used to automatically create Help Desk tickets in Remedy.

Zenprise also integrates easily into traditional systems management products deployed in a customer environment. Zenprise root cause notifications and resolution instructions can be displayed in systems management products like Microsoft Systems Center Operations Manager 2007 (OpsMgr 2007), HP OpenView, NetIQ AppManager, IBM Tivoli, CA Unicenter, BMC Patrol, and others. For IT organizations that use Microsoft OpsMgr 2007, Zenprise provides a free Zenprise Connector. This Connector feeds Zenprise root causes into the OpsMgr console, and embeds resolution instructions directly into the Microsoft console. This allows administrators to use a single console to manage their entire messaging infrastructure.

PUTTING IT ALL TOGETHER: ZENPRISE IN ACTION

End-User A on Exchange Server EXCH01:
Service normal.

End-User B on Exchange Server EXCH02:
Inability to get email on BlackBerry device.

Exchange Server EXCH02:
Service normal for Outlook users.

BES Server BES03:
Unable to connect to Exchange server EXCH02.

End-User B is part of the VIP users being monitored by the Zenprise User Dashboard. The User Dashboard displays important configuration information about the user, as well as real-time BlackBerry and Exchange-server-related statistics.

In this scenario, the User Dashboard would show:

- The Last Connect Time for the user was 30 minutes ago
- There are no pending messages for this user (even though the user is complaining about messages not reaching their handheld)
- Test messages sent are actually received by the user
- The carrier and SRP networks appear to be fine in the dashboard
- The user's Exchange server (EXCH02) appears to be red, indicating a severe problem with the server
- Average performance of MAPI calls from BES03 server to EXCH02 is greater than 200 ms, indicating an impending connectivity problem



Correlate Symptoms

Zenprise automatically correlates these symptoms into groups. Zenprise's Infrastructure Model understands that User A's mailbox is serviced by BES server BES03, and the mailbox hosted on EXCH02. Based on dynamic performance base-lining, Zenprise detects the abnormal MAPI performance on Exchange Server EXCH02.

Identify Root Cause

Continuing with the example from above, Zenprise runs several diagnostic tests to help pinpoint the underlying cause on EXCH02 from BES03.

Test	Test Results
Network connectivity test from BES03 to EXCH03	ICMP echo test succeeded
RPC Endpoint Mapper connectivity from BES03 to EXCH02	Connectivity to RPC Endpoint Mapper (TCP port 135) succeeded
Mailbox Store status on EXCH02	Mailbox store hosting User A's mailbox on EXCH02 mounted
MAPI connectivity test to Information Store service on EXCH02	Connectivity to Information Store service port that the service registers dynamically with RPC Endpoint Mapper fails.

The underlying cause is automatically isolated to a MAPI connectivity failure from BES03 to EXCH02.

PARTNERSHIP WITH RESEARCH IN MOTION

Zenprise is a Research In Motion (RIM) ISV Partner and provides proactive troubleshooting for BlackBerry infrastructure problems.

"Customers rely on the BlackBerry solution to enhance corporate productivity outside of the office, solutions from companies like Zenprise can help our enterprise customers maintain service levels in a cost effective and predictable manner as their BlackBerry deployments quickly grow."

– Jeff McDowell

Vice President, Global Alliances
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