



# Managing Sharepoint with GSX

Download a free trial at www.gsx.com

© GSX Solutions



# Contents

1- Introduction	2
1.1 The explosion of SharePoint demands	3
1.2 Keeping a lid on SharePoint costs	3
2. Make it work for the user!	4
2.1 Measuring the user's Web experience	5
2.2 Assuring data delivery	6
2.3 The right data At the right moment	8
2.4 Let's use the data	9
2.5 Working as a group	10
3- Keeping costs in line	11
3.1 Controlling the size of your SharePoint environment	11
3.1.1 Managing data in real time	12
3.1.2 Generating SharePoint reports	16
3.1.3 Forecasting	17
3.2 Optimizing SharePoint resources	18
3.2.1 Preventing adverse business impacts	18
3.2.2 Anticipating costs	21
3.2.3 Optimize your SharePoint Human resources	22
3.3 Reducing supervisory costs	23
No code on server: Easy to deploy, maintain and use!	23
3.3.1 Easily manage your Alerts	23
3.3.2 SCOM Integration	25
4- Conclusion	26





# 1- Introduction

What is SharePoint, and how is it used?

These seemingly trivial questions are critical to getting a handle on SharePoint management.



From years of experience with SharePoint customers, GSX has come to a greater understanding of how it is structured and deployed in various companies. We have found, for example, that one company may use it for online surveys, while another uses it to develop intranet and business applications.

While SharePoint is a great tool for enabling people to work together with shared data, its oversight presents two challenges:

- It has to work for users, and
- Costs have to be kept under control.





# **1.1 The explosion of SharePoint demands**

We have found that SharePoint data proliferation usually increases dramatically over time, regardless of company profile, resulting in the rapid growth of administrative demands.

Security and integrity requirements also increase with time, including permissions and profil management, versioning, search, and the indexer.

SharePoint collaboration services have to be up and running all of the time and performing acceptably. Would it be acceptable to say that your SharePoint service is available if it takes a user five minutes to upload a 10 Kb document?

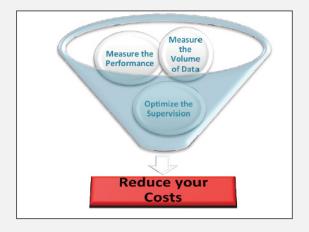
Unfortunately, most traditional SharePoint monitoring tools only give a system view of servers and services, rather than a true view of the user experience. Also, management and control over the entire environment often requires several tools that are limited in monitoring and reporting capabilities.

# 1.2 Keeping a lid on SharePoint costs

It's not enough for SharePoint installations to be useful, their costs must also be kept under control. Two essential components to monitor in that regard are:

- **The amount of data,** to manage expanding storage, security, and administration.
- **Delivery performance,** to keep a handle on upkeep and maintenance.

Moreover, monitoring and reporting must be in a form that administrators can understand, so that costly upper level administrators and engineers can focus on high-level tasks.





# 2. Make it work for the user!

As SharePoint becomes critical to workplace efficiency, it is vital to ensure that its services are both available and acceptable to users. System monitoring tools can often see green, while users actually see red. For example, if it takes a user ten minutes to access a service, that service is de facto unavailable.

As the object of SharePoint is to deliver end-user services, it is essential monitor system performance from the users' point of view. To do this manually would entail continuous testing from a user perspective – a boring and laborious task. Tools such as SCOM provide general system information, but they don't reveal service status because a system can be up while the service is down.

From the standpoint of the user, SharePoint data must:

- Be delivered in a reasonable time,
- Be accurate when delivered by the research, indexer, and versioning, and
- Integrity Handy Controlled Data
- Provide the ability for the user to modify, organize, save, and copy.

These three aspects have to be constantly monitored to assure optimal return on your SharePoint investment. Imagine the potential for loss if the sales team is working with outdated business proposals, or if the production and marketing teams can't find the right information.

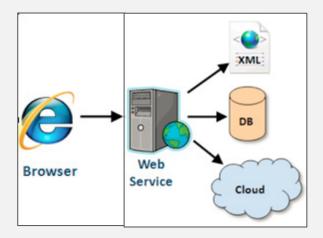




# 2.1 Measuring the user's Web experience

Since SharePoint's Web services are the core for the user experience, it is critical for monitoring tools to simulate user activity to see if these services are being delivered as advertised.

Tests performed by GSX Monitor give you a clear view on your user experience because they cover all the features as a user. More than just testing the service, GSX Monitor tests the performance of these services. This information is important to have, because a decrease in service performance can be the first step in a major problem.



GSX Solutions' flagship product, GSX Monitor and Analyzer, continuously tests the availability and performance of SharePoint Web services as delivered to the user. This helps customers:

- Control service delivery through an interactive visual dashboard that displays the real time status of your entire environment (see Figure 1 below).
- Reduce costs by highlighting underperforming servers that need immediate attention before they impact business.
- Measure against set SLA's to forecast potential



Up Micros	soft Environment			Up Mobility	
Up Ex	change 2007				
Up Exchange 2007	CAS	Mailbox	Mail	Up BlackBerry Enterprise servers	User Log Srp
AUMBEX00 SMTP GTW AU		(		GSXLNTEST2/GSX	0° 0
AUMBERO1 SMTP bkp AU		(	0	GSXLNBES GSX	
JPTYEXOO SMTP GTW Asia		(	0	GSXLNTEST3/GSX	
JPTYEX50 User server 1		(	0	GSXLNTEST5/GSX	0° 0 0
JPTYEX52 User server 3		(	0	GSXLNTEST4/GSX	
JPTYEX33 User server 4		(	0		
CHZHERS 4 User server 3		(	0	Up Lotus Traveler	
USNYEX00 SMTP GTW US		(	•	Up Traveler servers	User
A CONTRACTOR OF				GSX Traveler Server	<b>6</b>
Up Exchar	ige 2010 Platform			GSX Traveler test server	6
Up GSX DAG	CAS	Mailbox	Mail	Traveler pre prod server	0
Mailbox server 1	0		0		
Mailbox server 2	0	4 (	0		
Up Microso					
Up Sharepoint	servers		Log Sql		
Sharepoint WFE1			00		
SharePoint WFE2			õ õ		
SharePoint Indezer			00		
Up Web I	Page Availability				
GSX Home Page					
Up Active D	irectory Availability				
Active Directory					
		_			

*Figure 1:* GSX gives you the real time status of your entire collaborative environment.

# 2.2 Assuring data delivery

Depending on the specific deployment, various Web services are invoked.

To assure access to data, GSX Monitor simulates the activity of a user performing real actions for a given Web service:

Webs give you an alert if a user is unable to access the SharePoint site.

**Permissions** constantly checks to verify that permissions for a site or list are up, to assure user access.

**Webpart** lists the calendar, BI, RSS flow, SQL, etc., and monitor that they are effectively displayed and available.





#### **Sharepoint Sites: Webpart examples**

**User Profile** monitors administrator access to user profiles (organogram, responsibilities,etc.) and checks that the characteristics of a user account match what they truly are, to be sure that the service is available.

**Users Group** constantly attempts to list the users and groups that are allowed to access a specific site, to assure that administrators can add or remove users in a SharePoint cross-site group.

**Views** assures that a site administrator can show a library with a custom view, by generating a list of documents, exactly as a user would.

**Imaging** tests if images libraries can be correctly opened.

**List Item** checks to see if it is possible to add and erase list items, to assure that a user can form these actions.



# 2.3 The right data at the right moment

It's no good to access data if it's not the latest information.

Imagine if a sales professional is shown an outdated price list, or if the document SharePoint presents is an older version. To assure users are able to find the correct version of the document they need, several Web services are checked by GSX:

**Site Data** looks as a user would for the metadata related to a specific site, such as name,date, department, and division. If the read attempt fails, an alert will be sent.

**Alert** allows the administrator to create alerts for libraries or changes within them, such as erased document, modified document, or sum of the documents modified in the week. This enables the administrator to guarantee the integrity of the lists of SharePoint documents.

Versions make sure that users can access previous versions of documents.

**In addition to the web services the Indexer** allows you to set threshold alerts for this critical feature of your SharePoint database (see Figure 2):

SharePoint Creation Wiza	rd		<b>— X</b> —
Connectivity SQL Settings	SharePoint Inc	dexer Alerts	
Scanning	Elapsed time threshold s	nce last crawl	
Web Services	Threshold:	7 Days 👻	
Indexer Alerts	Threshold alert:	Disabled	
Log Scanning	Back to normal alert:	Disabled	
Disk Space	Threshold of unsuccessf	ul crawl elements	
Log Scanning Disk Space Maintenance Categorization	Threshold:	10 🛬	
Categorization	Threshold alert:	Disabled	
	Back to normal alert:	Disabled	

Figure 2: Setting SharePoint Indexer threshold alerts.





**Elapsed time threshold since the last crawl** alerts you if the last crawl hasn't taken place within the specified time.

**Threshold of unsuccessful crawl elements** alerts the administrator if a high percentage of indexer crawls failed, due to non-normalized documents, damaged data in the SQL database, or some other reason. Corrective action can then be taken before the problem seriously impacts user searches.

**Test search services** acts searches for a specific keyword to make sure that users can find what they are looking for in SharePoint.

#### 2.4 Let's use the data

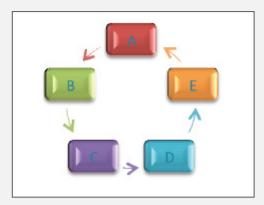
It's not enough for SharePoint data to be accessible, users have to be able to collaboratively modify, organize, share, copy, and integrate the data. GSX Monitor therefore performs the following usability tests:

**Copy** gets the stream of a document to assure that you can copy a document or library.

**Forms** tries to use a specific form, such as for customer feedback, to assure that the service is available.

**Sites** tries to read all the information from a template site (name, permissions by default, settings by default, etc.) to assure that a site can be created in SharePoint.

**Workflow** attempts to start a workflow to assure that a chain of actions can be defined.



**Upload Document** assures that users can upload documents.



#### 2.5 Working as a group

Since the whole idea of SharePoint is collaboration, GSX Monitor also continually tests that you can work together as a group:

**Document Workspace** accesses a document workspace and manipulates its content to assure this service is operational.

**Create a site collection** creates a site collection, checks the availability of the site, and then erases it.

Blog Post creates a blog entry and then erases it.

**Create a meeting** creates a meeting workspace, checks that the URL is available, and then creates a meeting.

**Test Excel Services** simulates a user opening an Excel spreadsheet and reading a field.





# 3- Keeping costs in line

While watching the SharePoint service and managing its performance is critical for your users, it is equally critical to manage SharePoint costs, which can easily spin out of control. To this end, GSX helps administrators to:

- Control the size of the environment
- Optimize SharePoint resources
- Monitor the platform

# 3.1 Controlling the size of your SharePoint environment

The number of sites In a SharePoint environment can increase dramatically as users create multiple sites and upload numerous documents. This can have a severe impact on service and make it difficult for users to obtain the information they need. The increasing size of SQL databases can raise capacity planning concerns.

When a migration occurs, administrators also need to have insight into the data, its usage, the sites and their performance.

GSX Monitor enables you to manage the evolution of your data:

- In real time, or
- With the reporting module.





# 3.1.1 Managing data in real time

The real time view in GSX Monitor provides invaluable information for managing the evolution of data within your environment.

Version: CPU Usage: Total RAM. RAM Used: Last Error: Sites Data: Number of sites: Number of docs	SharePoint 2010 0% 8181 MB 75%				Web Services : Web S							
Total RAM RAM Used: Last Error: Sites Data: Number of sites:	8181 MB				Web S			Web Services :				
RAM Used: Last Error: Sites Data: Number of sites:					Web Service Name Response			nse Time				
Last Error: Sites Data: Number of sites:	75%											
Sites Data: Number of sites:					Stes		200 ms					
Number of sites:					UserGroup		195 ms					
Number of sites:					Webs UserProfile		197 ms 229 ms					
					O OSET TOTE		22.5 115					
All such as all designs	22	Total size of sites: 82	20 MB									
Number of docs.	753	Total size of docs: 40	00255 MB									
Search indexer crawl												
Successfully crawled:	1894											
Warning(s):	1											
Last crawling Date:	24 Mar 11 14:54:55				L							
Content DB Information	on:							To				
			Number of		Size of Sites (	and the second		Size of Do (MB)				
SharePoint_AdminConte	tent_9016b7da-9fcf-4fa0-a	a51e-71e9bf04aeb8		2		55	124	28				
WSS_Content WSS_Content_10121		13		31	302	28						
WSS_Content_10086												
WSS_Content_10087				1		106	225					
				1		106 4	57 2					
WSS_Content_10088				1		106	57 2 0					
WSS_Content_220bf31	1172c2d4504bbfa76ffc1b3 3a7a7643b88a659cda4ba	lea69 sa70e6		1		106 4	57 2	8				
WSS_Content_220bf31	3a7a7643b88a659cda4ba	lea69 aa70e6		1		106 4 0 7	57 2 0 8	8				
WSS_Content_220bf31 WSS_Content_dBfo4b3 WSS_Content_MultiSte	3a 7a 7643b 88a659c da 4ba teo	ka69 sa70e6		1 1 0 1 1		106 4 0 7 6	57 2 0 8 25 10	8 t Find Previ				
WSS_Content_220b/31 WSS_Content_d8tc4b: WSS_Content_Mult Str Sites Information for	3a7a7643b88a655icda4ba lee r WSS_Content:	aa 70e6		1 1 0 1 1	1	106 4 0 7 6 9	57 2 0 8 25 10 Find Next	8 Find Previ To Size of D				
WSS_Content_2202431 WSS_Content_dBro&b WSS_Content_MultiStr Sites Information for Site till	3a7a7643b88a655icda4ba lee r WSS_Content:	kes69 as 70e 6 Descript	tion	1 1 0 1 1	Creation Date	106 4 0 7 6 9	57 2 0 8 25 10	8 Find Previ To Size of D				
WSS_Content_220b/31 WSS_Content_d8tc4b: WSS_Content_Mult Str Sites Information for	3a 7a 7643b 88a 659oda 4ba tee r WSS_Content. tie	aa 70e6	tion	1 1 0 1 1	Creation Date 26 May 10 15 24 4 31 May 10 09 470	106 4 7 6 9 9	57 2 0 8 25 10 Find Next	8 Find Previ To Size of D				
WSS_Content_28Cb43 WSS_Content_38Cb45 WSS_Content_Mub/Sk Sites Information for Site till Mon ate Project Web App TestFromCA	3a7a7643b88a659cda4ba tee r WSS_Content tie Applici	ea 70e6 Descript aton Web Microsoft Project Server		1 1 0 1 1 2	26 May 10 15:24:4 31 May 10 09:47:0 8 Jun 10 12:25:20	106 4 7 6 9 9	67 2 0 8 25 10 Find Next Namber of Docs 6 0 2 35 6 4	8 Find Previ To Size of D				
WSS_Content_28043 WSS_Content_d8046 WSS_Content_MultiStr Sites Information for Site till Monitol Project Web App TestFromCA Jonathan Muler	3a7a7643b8be659cda4bz rWSS_Content: tie Applici	as70e6 Descript aton Web Microsoft Project Server at Tespace personnel de Jonathan Mußer V	ous pouvez utiliser cet espace	1 1 1 1 2	26 May 10 15:24:4 31 May 10 09:47:0 8 Jun 10 12:25:20 7 Sep 10 10:12:38	106 4 0 7 6 9 9	67 2 0 8 25 10 • Find Next • Find Next • Find Next • Constant • Co	8 Find Previo Tol Size of D				
WSS_Content_2020/31 WSS_Content_diff-0-5 WSS_Content_diff-0-5 Sites Information for Sites Information for Sites inf Moniste Project Web App TestFromCA Jonathan Muler Sebastion Ginud	3a7a7643b88a659cda4bz r WSS_Content: tile Applic Ceci e	Descript aton Web Microsoft Project Server at legaco personnel de Jonathan Muler. W I legaco personnel de Sebastien Graud.	ous pouvez utiliser cet espace Vous pouvez utiliser cet espace	1 1 1 1 2 pour orier dea pour créer dea	26 May 10 15 24 4 31 May 10 09 47 0 8 Jun 10 12 25 20 7 Sep 10 10 12 38 2 Jun 10 13 05 50	106 4 0 7 6 9 9 9 5 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8 9 9 9 9 9	57 2 9 8 25 10 • Find Next 2 2 2 3 5 6 4 4 4 0 3 120	8 Find Previ To Size of D				
WSS_Content_28043 WSS_Content_d8046 WSS_Content_MultiStr Sites Information for Site till Monitol Project Web App TestFromCA Jonathan Muler	a 7a7643b8bs55bcds4bz e WSS_Content: tite Applic Coci e Coci e Coci e Coci e	Descript aton Web Monself Project Server at Trapsco personnel de Jonathan Muler. V et Trapsco personnel de Sebastro Graud.	ous pouvez utiliser cet espace Vous pouvez utiliser cet espace us pouvez utiliser cet espace p	1 1 1 1 2 2 2 2	26 May 10 15 24 4 31 May 10 09:47 0 8 Jun 10 12:25:20 7 Sep 10 10:12:38 2 Jun 10 13:05:50 1 Jul 10 15:42:01	106 4 0 7 6 9 9 9 5 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8 9 9 9 9 9	67 2 0 8 25 10 • Find Next • Find Next • Find Next • Constant • Co	8 Find Previo Tol Size of D				
WSS_Content_2020/31 WSS_Content_diff-66 WSS_Content_diff-66 WSS_Content_MailSet Sites Information for Sites Information for Site Inf Include Project Web App TestFromCA Jonathan Maler Sebastien Ginud Vincent Heypel Partick Trave GSX/2 Macanacons	a 7a7643b8be55bcde4br eventee e WSS_Content: tite Applic Coci e Coci e Coci e Coci e Coci e Coci e Coci e Coci e Coci e Coci e	Descript atom Web Moroseft Project Server atom Web Moroseft Project Server Infrance personnal de Jonathan Maler Ve Infrance personnal de Schatten Cittado Infrance personnal de Schatten Cittado Infrance personnal de Schatten Cittado	ous pouvez utiliser cet espace Vous pouvez utiliser cet espace us pouvez utiliser cet espace p a pouvez utiliser cet espace po ii. Vous pouvez utiliser cet esp	1 1 1 1 1 2 ppur créer des pour créer des pour créer des la soce pour créer des la	26 May 10 15:24.4 31 May 10 09:47:0 8 Jun 10 12:25:20 7 Sep 10 10 12:38 2 Jun 10 13:05:50 1 Jul 10 15:42:01 24 Sep 10 12:13:57 21 Oct 10 09:58:58	106 4 7 6 9 9 5 14 5 14	57 2 0 8 25 10 10 10 10 10 10 10 10 10 10 10 10 10	8 Find Previo Tol Size of D				
WSS_Content_attracts WSS_Content_attracts WSS_Content_attracts WSS_Content_MailsRe Sites Information for Sites Information for State tit Project Web App TestFromCA Jonathan Mular Sebatine Graud vincent ribeyral Parksk Trave	a 7a 764 2686559cds4ba r WSS_Content: tie Applica Code e Code e Code e Code e Code e Code e Code e Code e	Descript aton Web Moroseft Project Server at Inspace personnel de location Maire V el repace personnel de Schalten Grand el repace personnel de vancet durget Va	ous pouvez utiliser ost espace Vous pouvez utiliser ost espaco la pouvez utiliser ost espaco p a pouvez utiliser ost espaco p si. Vous pouvez utiliser ost espaco ni. Vous pouvez utiliser ost espaco	1 1 1 1 1 2 ppur crèter des ppur crèter des ppur crèter des ppur crèter des ppur crèter des ppur crèter des la ppur crèter des ppur crèter des la ppur c	26 May 10 15 24-4 31 May 10 09.47.0 8 Jun 10 12-25:20 7 Sep 10 10 12 38 2 Jun 10 13:05:50 1 Jul 10 15:42:01 24 Sep 10 12:13:57 21 Oct 10 09:58:58 14 Jun 10 10:40:06	106 4 7 6 9 9 5 14 5 14	67 2 2 8 25 10 10 10 10 10 10 10 10 10 10 10 10 10	E Find Previe Tol Size of D (MB)				
	Error(s): Last crawling Date: Content DB Informati SharePoint_AdminCont WSS_Content_U008 WSS_Content_U008	Error(s): 4 Last crawling Date: 24 Mar 11 14 54 55 Content DB Information: StraenPort_AdminContent_5018b7ds9fcf4a04 WSS_Content_10031	Error(s): 4 Last crawling Date: 24 Mar 11 14:54:55 Content DB Information: Content DB Information: Content DB Information: Content DB Insertion: Dates Front, AdvanContent, 50106766-961-460-0516-71696/04ee68 WSS Content, 10081	Error(s): 4 Last crawling Date: 24 Mar 11 14:54:55 Content DB Information: Content DB Information: Content DB name Number of DatePoint_AdmicContent_501(b):768:9fc/4:e0:451:e-71:69fc/64e0:8	Error(s) 4 Last cranifing Date: 24 Mar 11 14:54:55 Content DB Information: Content DB Information: Content DB Information: Content DB name Number of Sites Date: 2010;00 credits 2010;00 April 4:00 a516-71:69(10);00 April 4:00 April	Error(s). 4 Last cranifing Date: 24 Mar 11 14:54:55 Content DB Information: Content DB Informatio: Con	Error(s) 4 Last craning Date: 24 Mar 11 14:54:55 Content DB Information: Content DB Informatio: Conten	Error(s): 4 Last crawling Date: 24 Mor 11 14:54:55 Content DB Information: Content DB name Number of Sites Size of Sites (MB) Number of Docs Size of Sites (MB) 2 555 (124) DVS Storferd 2 555 124				

Figure 3: Viewing real time SharePoint statistics

On top you will see useful system information on Version, CPU Usage, Total RAM, RAM Used, and the Last event log error.

Below that you will find a general overview of the size of your infrastructure:

**Number of site collections** (that contain all the sites and subsites) displays SQL data on the total size of sites, number of documents, and total size of documents for your entire SharePoint environment.

**The size of the site collections** is generally larger than the total size of all documents as it includes such items as webparts and workflow configuration files. Knowing the difference can be valuable.



Just below this you will see the **content database Information** with the database name,number of site collections per database, the sizes of the sites, the number of documents, and their size.

Content DB name	Number of Sites	Size of Sites (MB)	Number of Docs	Size of Docs (MB)
SharePoint_AdminContent_9016b7da-9fcf-4fa0-a51e-71e9bf04aeb8	2	55	124	722
WSS_Content	13			28449
WSS_Content_10081	1	31	225	2172
WSS_Content_10086	1	106	57	8346
WSS_Content_10087	1	4	2	3
WSS_Content_10088	0	0	0	
WSS_Content_220bf3172c2d4504bbfa76ffc1b3ea69	1	7	8	56
WSS_Content_d8fc4b3a7a7643b88a659cda4baa70e6	1	6	25	56 205
WSS_Content_MultiStes	2	9	10	67

Figure 4: Viewing SharePoint content DB information in GSX Monitor

This enables you to see how the data is split among site collections, and the size of the collections. If you have a problem with a large content database, it will be seen here.

For each content database, you will find the list of all the sites it contains, including, the name of the site, description, creation date, size, number of documents, and size of the documents).

Site title	Description	Creation Date	Size (MB)	Number of Docs	Size of Docs (MB)
Mon site		26 May 10 15:24:4	6	0	
Project Web App	Application Web Microsoft Project Server	31 May 10 09:47:0	12	35	
TestFromCA		8 Jun 10 12:25:20	6	4	
lonathan Muller	Ceci est l'espace personnel de Jonathan Muller. Vous pouvez utiliser cet espace pour créer des	7 Sep 10 10:12:38	4	0	
Sebastien Giraud	Ceci est l'espace personnel de Sebastien Giraud. Vous pouvez utiliser cet espace pour créer de	2 Jun 10 13:05:50	143	120	
rincent ribeyrol	Ceci est l'espace personnel de vincent ribeyrol. Vous pouvez utiliser cet espace pour créer des l	1 Jul 10 15:42:01	4	0	
atrick Treve	Ceci est l'espace personnel de Patrick Treve. Vous pouvez utiliser cet espace pour créer des lis	24 Sep 10 12:13:57	4	0	
SX2\ABuonaccorsi	Ceci est l'espace personnel de GSX2VABuonaccorsi. Vous pouvez utiliser cet espace pour crée	21 Oct 10 09:58:58	49	21	
Nivier Raynaut	Ceci est l'espace personnel de Olivier Raynaut. Vous pouvez utiliser cet espace pour créer des	14 Jun 10 10:40:06	5	7	
SX2\glandra	Ceci est l'espace personnel de GSX2\glandra. Vous pouvez utiliser cet espace pour créer des li	4 Jan 11 11:16:57	4	0	
harePoint Admin	Ceci est l'espace personnel de SharePoint Admin. Vous pouvez utiliser cet espace pour créer d	17 Sep 10 07:29:48	4	0	

Figure 5: Viewing SharePoint site information in GSX Monitor

Database by database you can easily check for inappropriately sized sites and determine the storage needs of your SharePoint infrastructure.

Statistics can be exported to Excel, or you can view them in the GSX Analyzer reporting tool, which consolidates the data and enables you to view trends and generate reports.





CISH0000 - Shangai u	JPTY0001 -	Tokyo use	INDND0000	) - New De	. ARB	A0000 - E	suenos	
Statistic name		28Jul11	293	ul11	30Jul11	L	31Jul11	
Server: %Up 24h (time)		100.00	10	00.00 100.0		.00 100.00		
Server: Down 24h (sec)		0		o	c	o l	0	
Server: average access time (ms)		273		320	274	1	311	
Server: longest downtime (sec)		0		0	C	0	0	
Network: %Up 24h (count)		100.00	10	0.00	100.00	0	100.00	
	Drag and	Drop one or mu	ultiple entries	to graph th	em.			
400	) Server: Dow.	(2) Serve	er: aver	(2) Serve	r: long	(3) Se	rver: ave	er
	) Server: Dow.	(2) Serve	er: aver	(2) Serve	r: long	(3) Se	rver: ave	er
(1) Server: %Up (1 500 400 300 200	) Server: Dow.	(2) Serve	er: aver	(2) Serve	r: long	(3) Se	rver: ave	Pr

Figure 6: Viewing trends in GSX Analyzer

This real time view of your overall environment also enables you to compare the information among the servers or across your SQL environment in the correct time frame. Multiple tabs provide a wide range of Information about your environment, including alerts, log reports, and trending and environmental health.

GSX Analyzer is fully customizable according to customer, server groups, team type, and so on. You can create custom access profiles according to servers and/or the features that you want to offer.



The GSX Analyzer dashboard can be customized according to various users' permissions. The main view shows the performance and the size of your environment at a glance, up to 15 days' of history, and a list of the last 10 alerts.

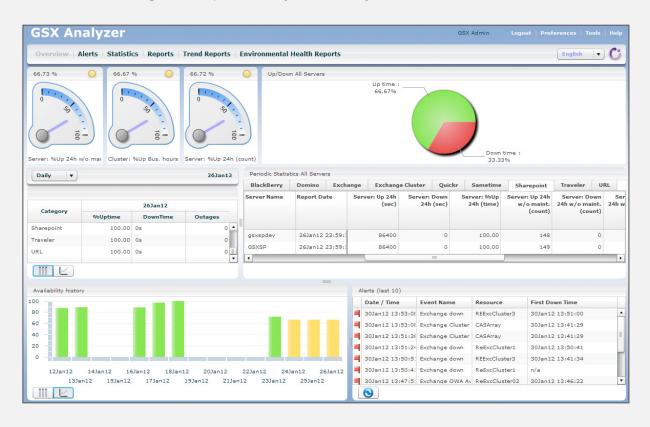


Figure 7: Viewing environment status in the GSX Analyzer dashboard.



#### **3.1.2 Generating SharePoint reports**

GSX enhances and simplifies SharePoint reporting with an intuitive, template-driven interface. The SharePoint administrator has a clear view on the size and growth of the environment, and can anticipate disk and SQL storage problems. For example, under the GSX Analyzer "Trends profile" tab you can edit and activate trend reports, and designate recipients.

ools							
0	Tre	nd Reports Configura	tion				
			ending of custom Trend Repor		figur	rations by using the button	
Automated reports	belo	ow. Deletion of a configu	ration can be performed from	an edited document.			
Statistics Reports Configuration							
Trend Reports Configuration		✓ Enable Automatic Trends generation					
Environmental Health Reports C	0						
Security	Co	nfiguration <b>v</b>					
Access Level		Configuration name	Report type	Report Title		Distribution List	
/ 🕄 Settings	1	SharePoint availability	Summary of servers statis	GSX Trends Default Repor			
Backup	1	SharePoint	Summary of servers statis	GSX Trends Default Repor			
Documents Deletion	1	CAS Stats	Summary of servers statis	GSX Trends Default Repor	Þ	jbongiovanni@gsx.net	
Image Library							
Email							
PDF Configuration							
🖓 🏹 System							
System							
Agent Log							
		Create Edit	Delete				
					6	OK Cance	

Figure 8: GSX Analyzer trend report listing.

Reports can be published online or distributed via email. Once they are set up, the management of multiple reports is very easy. Moreover, you can customize the report (logo,text, title, etc.) and preview it on GSX Analyzer.



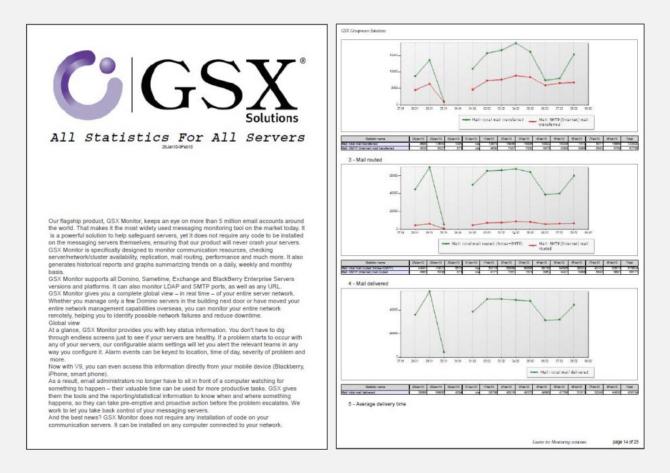


Figure 9: An automatically distributed SharePoint report.

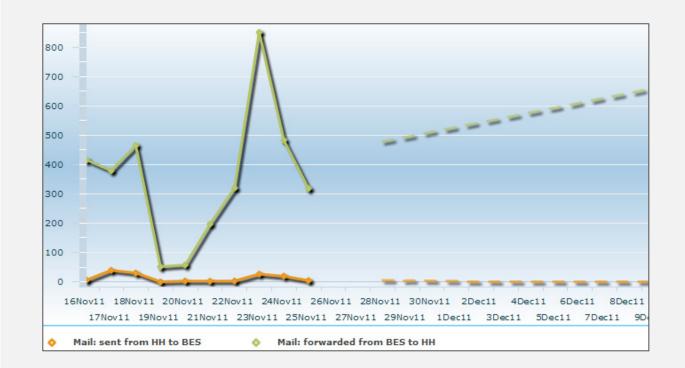
#### 3.1.3 Forecasting

When it comes to Capacity Planning, reporting on usage, performance and capacity are even more critical. GSX Analyzer allows you in a very user friendly way to generates reports with this functionality.

Simply click on the Forecasting box, select the time period and GSX will calculate what should be your statistics in the future regarding what you get previously.







# **3.2 Optimizing SharePoint resources**

Containing costs requires a clear view of the performance of your global environment, together with alerts to emerging problems.

#### 3.2.1 Preventing adverse business impacts

Declining performance and outages caused by an explosion of SharePoint data can have a major business impact and incur costs for crisis management, consulting and analysis.

GSX Monitor helps prevent these problems, by alerting administrators to take corrective action before they have a major impact.

When you configure sites you want to monitor, GSX will constantly test access time and alert you if there is a timeout.





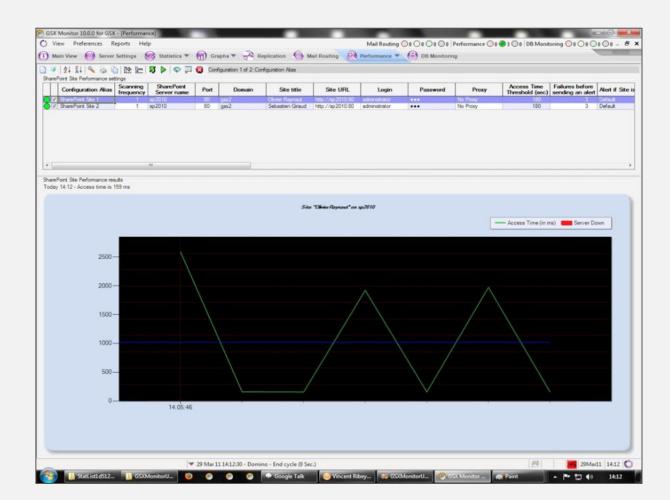


Figure 10: GSX constantly tests a site's performance.

For each server, you will be able to display real time graphs for various parameters, such as access time, and CPU and RAM usage. The administrator can then troubleshoot problems by viewing statistics for previous days.



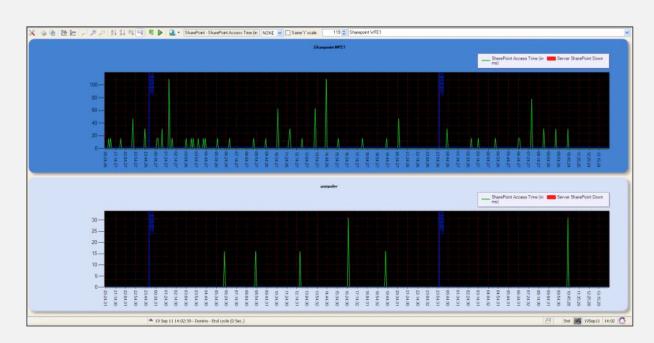


Figure 11: Troubleshooting SharePoint problems in GSX Monitor.

GSX also gives you a quick view via user simulation of response (in ms) for various server parameters, to help pinpoint critical service deterioration.

Web Service Name	Response Time
Alerts	16 ms
SiteData	266 ms
Sites	172 ms
UsersGroups	219 ms
Webs	203 ms

Figure 12: Viewing response in ms for various server parameters.

Another important indicator in GSX Monitor is the warnings and errors derived by crawling the database to catch the metadata involved in a user search.

Search indexer crawling status:				
Successfully crawled:	3765			
Warning(s):	1			
Error(s):	20			
Last crawling Date:	21 Jan 12 22:58:53			

Figure 13: Warnings and errors derived by crawling the database.

Download a free trial at www.gsx.com



#### 3.2.2 Anticipating costs

While real time statistics help to contain immediate business impacts, you also need measures that will help to control long term costs. For that you need to have a clear view of the performance of multiple SharePoint servers over time.

One means is to compare the performance of various servers in terms of key performance indicators against service levels. This gives administrators a clear picture of where to invest additional resources.

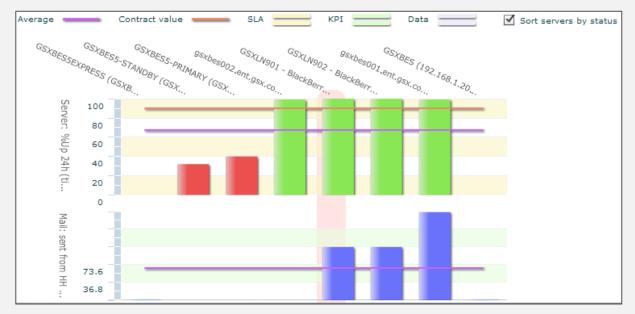


Figure 14: Comparing server performance.

Will merging with a new company require an additional SharePoint server? How does the growing number of documents impact memory usage? Do service demands peak on certain days of the week? Is a shortage of disk space impacting access time? Are loads balanced among servers?

GSX Analyzer's automatic trending can help answer these and other questions in order to keep your costs in line, while maintaining a high level of service to various business lines.



SX Analyzer	Trend Reports - Environmental Health	Penorts	GS	X Admin	Logout   Preferen	nglish
rends		Reports	_	_		
Manually Created	GSX Trend, Daily Report from 1Feb12 to 12	2Feb12				
▼ 🗁 Daily	Exchange					
▼ 🗁 Summary of servers statistics	Statistic name	1Feb12	2Feb12	3Feb12	4Feb12	5Feb12
V = Feb, 12	Server: %Up 24h (count)	0.00	9.93	13.17	14.29	14.29
14Feb12 GSX Trend, Daily Repo	Server: %Up 24h (time)	0.00	16.72	13.67	14.29	14.29
14Feb12 GSX Trend, Daily Repo	Server: %Up 24h w/o maint. (count)	0.00	9.93	13.17	14.29	14.29
13Feb12 GSX Trend, Daily Repo	Server: %Up Bus. hours w/o maint. (cc	0.00	9.31	10.10	0.00	n/a
13Feb12 GSX Trend, Daily Repo						
13Feb12 GSX Trend, Daily Repo	Dee	g and Drop one or r				
13Feb12 GSX Trend, Daily Repo		g and prop one of i	numple entries to	graph them.		
10Feb12 GSX Trend, Daily Repo	Exchange 🖾					
9Feb12 GSX Trend, Daily Report	18					
9Feb12 GSX Trend, Daily Report	16 -					
7Feb12 GSX Trend, Daily Report						
7Feb12 GSX Trend, Daily Report	14					
7Feb12 GSX Trend, Daily Report	12					
7Feb12 GSX Trend, Daily Report						
7Feb12 GSX Trend, Daily Report	10					
7Feb12 GSX Trend, Daily Report						
7Feb12 GSX Trend, Daily Report	8					
7Feb12 GSX Trend, Daily Report	6					
7Feb12 GSX Trend, Daily Report						
6Feb12 GSX Trend, Daily Report	4					
2Feb12 GSX Trend, Daily Report	2 -					
2Feb12 GSX Trend, Daily Report						
16Feb12 GSX Trend, Daily Report	0 1					
15Feb12 GSX Trend, Daily Repo     15eb12 TestGSX Trend, Daily Re	1Feb12 2Feb12 3Feb12 4Feb12	5Feb12 6Fe	b12 7Feb12	8Feb12 9Fe	b12 10Feb12 :	11Feb12 12Fe

Figure 15: Tracking trends with GSX Analyzer.

When services are delivered by a third party, GSX Monitor and Analyzer gives you an independent tool to measure against SLAs and detect performance problems before they do.

Forecasting capabilities to precisely predict your needs.

#### 3.2.3 Optimize your SharePoint Human resources

The explosion of SharePoint systems has outpaced growth in the number of skilled SharePoint administrators, making it essential to automate monitoring and the reporting so as to conserve their skills for more critical tasks.

With GSX, you can delegate day-to-day supervision to junior SCOM administrators, who can then report to senior administrators on any issues that arise. Predefined and customized templates and alerts simplify their task of overseeing complex SharePoint environments.



# **3.3 Reducing supervisory costs**

Managing SharePoint operations requires a view of multiple factors, including log problems, SQL problems, and site and indexer performance, so you can quickly pinpoint emerging issues.

GSX gives you a complete view of your entire collaborative environment in a single console, including Exchange, SharePoint, Web Pages, AD, BlackBerry Servers, and Domino.

#### No code on server: Easy to deploy, maintain and use!

In monitoring all of these environments, GSX acts as a user and does not install any code on the monitored servers themselves. Moreover, the administrator doesn't have to check the status of the server one by one – they are all in the same view.

#### 3.3.1 Easily manage your Alerts

GSX Monitor has a simple yet powerful alert system which allows you to define which team will be alerted and in what manner.

Configuration of profile Default					
This Alert configuration screen is common to the whole software. Wh Move Available alerts to the Profile details in order to use them for th	en an alert condition is met, Monitor triggers the selected alert Profile. is profile.				
Profile Configuration					
Profile : Default	New Rename Delete				
List of Available Alerts:	Profile Details:				
Here are the alerts you can use in a Profile. They are not selected yet !	Here are the alerts triggered for the Profile above, in case a threshold is reached.				
	Lecation is disabled				
	<u>OK</u> <u>Cancel</u>				

Figure 16: Configuring alert profiles.

You can set separate alert profiles, such as to warn your storage team of capacity issues, and mobility teams of BlackBerry availability issues. "Program" alerts can, for example, execute a Power Shell command to automatically diagnose or fix SharePoint problems.

SMS alerts can be sent via the GSM network should a general network failure occur.



GSX Monitor efficiently distributes alerts to the appropriate parties according to three parameters you set:

- Severity
- Send reminders until the issue is resolved
- Escalation, for example, to the senior engineer after a set period of time.

Some customers send all alerts to SCOM, while others only use SCOM as an operations tool. Either way GSX Monitor provides an easy way to organize alerts.

Each time an alert is sent to a team, it is also sent in real time to GSX Analyzer.

	Custom period	Last day	Show All	· · · · · · · · · · · · · · · · · · ·	Sort by Date V			ð	SV PDF	Filter(1)		
	Arrival date	Date / Time	Event Name	Resource	First Down Time	Down For	Status	Status Details	Reminder	Escalation	Station Name	
-	15Nov11 10:04:0	7 15Nov11 10:03:31	Exchange down	ReExcCluster1	3Nov11 18:04:32	11d 15h 58m 42s			0		GSX Monitor Paul	
1	15Nov11 10:04:0	7 15Nov11 10:03:31	Exchange down	ReExcCluster02	3Nov11 18:04:35	11d 15h 58m 42s			0		GSX Monitor Paul	
1	15Nov11 10:04:0	6 15Nov11 10:03:30	SharePoint down	gsxspdev	3Nov11 17:16:07	11d 16h 47m 7s				0	GSX Monitor Paul	
1	15Nov11 10:03:0	5 15Nov11 10:02:30	SharePoint down	gsxspdev	3Nov11 17:16:07	11d 16h 46m 6s			0		GSX Monitor Paul	
ł	15Nov11 10:02:5	1 15Nov11 10:02:16	Exchange down	ReExcCluster1	3Nov11 18:04:32	11d 15h 57m 42s			0		GSX Monitor Paul	
1	15Nov11 10:02:1	0 15Nov11 10:01:34	Exchange down	ReExcCluster02	3Nov11 18:04:35	11d 15h 56m 42s			0		GSX Monitor Paul	
I.	15Nov11 10:02:0	5 15Nov11 10:01:29	SharePoint down	gsxspdev	3Nov11 17:16:07	11d 16h 45m 6s				0	GSX Monitor Paul	
1	15Nov11 10:01:5	2 15Nov11 10:01:16	Exchange down	ReExcCluster1	3Nov11 18:04:32	11d 15h 56m 42s			0		GSX Monitor Paul	
ŧ.	15Nov11 10:01:1	0 15Nov11 10:00:34	Exchange down	ReExcCluster02	3Nov11 18:04:35	11d 15h 55m 42s			0		GSX Monitor Paul	
ŧ.	15Nov11 10:01:0	5 15Nov11 10:00:29	SharePoint down	gsxspdev	3Nov11 17:16:07	11d 16h 44m 6s			0		GSX Monitor Paul	
	15Nov11 10:00:5	1 15Nov11 10:00:16	Exchange down	ReExcCluster1	3Nov11 18:04:32	11d 15h 55m 42s			0		GSX Monitor Paul	
1	15Nov11 10:00:0	9 15Nov11 09:59:34	Exchange down	ReExcCluster02	3Nov11 18:04:35	11d 15h 54m 42s			0		GSX Monitor Paul	
1	15Nov11 10:00:0	5 15Nov11 09:59:29	SharePoint down	gsxspdev	3Nov11 17:16:07	11d 16h 43m 6s				0	GSX Monitor Paul	
ŧ.	15Nov11 09:59:5	1 15Nov11 09:59:16	Exchange down	ReExcCluster1	3Nov11 18:04:32	11d 15h 54m 42s			0		GSX Monitor Paul	
ı.	15Nov11 09:59:0	9 15Nov11 09:58:34	Exchange down	ReExcCluster02	3Nov11 18:04:35	11d 15h 53m 42s			0		GSX Monitor Paul	
ı.	15Nov11 09:59:0	4 15Nov11 09:58:29	SharePoint down	gsxspdev	3Nov11 17:16:07	11d 16h 42m 6s			0		GSX Monitor Paul	
	15Nov11 09:58:1	0 15Nov11 09:57:34	Exchange down	ReExcCluster02	3Nov11 18:04:35	11d 15h 52m 42s			0		GSX Monitor Paul	
	15Nov11 09:58:0	4 15Nov11 09:57:29	SharePoint down	gsxspdev	3Nov11 17:16:07	11d 16h 41m 5s				0	GSX Monitor Paul	
i	15Nov11 09:57:5	2 15Nov11 09:57:17	Exchange down	ReExcCluster1	3Nov11 18:04:32	11d 15h 52m 42s			0		GSX Monitor Paul	
L) -	The filter is only app	lied to the loaded data.				_			Loaded alerts	50 out of 6	5 alerts for Tue Nov 1	.5 2
ub	ject >	Exchange task is not re	esponding.									
od	No Mi Ba Mi La	is message is a warnin action required: The E assage sent because a ackground task supervis aximum Idle time in se ist run date: 12 Nov 11 eeze detection date: 11	exchange task will re- n exception has bee sion is enabled. conds before time-o 02:22:21	start automatically. n caught.	: receive it daily.							

Figure 17: Viewing alerts in GSX Analyzer.





#### **3.3.2 SCOM Integration**

Seamless integration with SCOM via the GSX Management Pack makes it easy to manage your Exchange and SharePoint environments. To configure the integration between SCOM and GSX you just have to state a new device management setting in SCOM, and then import the management pack.

Once configured, SCOM is able to collect the SNMP Traps in the alerts view.

NG CRIF NEW ON NEURID	Tools Help					
Q Search + 🐲	Scope Rind Actions 🔬	🖞 Show at least 1 week of data 🔹 🗏 Overrid	ies +			
onitoring	Critical Alerts (9)					
Monitoring	Q Look for:	Find Now Clear				
Active Alerts	Description		Resolution State	Created	Duston Field 8	1
Discovered Inventory	E Source: 192.168.1.74 (9)		-			- 11
Distributed Applications	19/03/2009 23:33:42 - Exchange	e down: GSX-EXC2003 (SVR. OUTBOUND) Down	New	19/03/2009 23:33:26		
Task Status test destboard	19/03/2009 17:23:27 - Semetime	New	19/03/2009 17:24:18			
test parf	19/03/2009 17:06:24 - Semetime	New	19/03/2009 17:06:13			
Agentless Exception Monitoring     Gass Platform Servers	19/03/2009 16:51:23 - Sametime	e down: gsxdemo.gsx.net (GSX internal Chat s	New	19/03/2009 16:51:12		
Unix/Linux Server State	19/03/2009 16:21:20 - Sametime	19/03/2009 16:21:20 - Sametime down: gsxdemo.gsx.net (GSX internal Chat s				
E im GSX Monitor Management Pack	19/03/2009 15:15:24 - Sametime	e down: gsxdemo.gsx.net (GSX internal Chat s	New	19/03/2009 15:17:01		
GSX Monitor Daenboard	19/03/2009 13:55:44 - Exchange	New	19/03/2009 13:56:34			
Critical Alerts	19/03/2009 13:37:20 - Exchange	e Cluster down: Exchange Cluster 1 (Exchange	New	19/03/2009 13:38:13		
Information Alerts Warning Alerts		a Cluster dawn: Ewchaness Cluster, 1 (Ewchaness	Alces.	10.572 (2000) 11:56:37		
E Microsoft Audit Collection Service	Warning Alerts		_	_	_	-
🖻 🧾 Microsoft Exchange Server	Q Look for:	Find Now Clear				
			Resolution State	Created	Custom Field 8	
Control Wendows Clerk     Wendow Clerk     Wendow Clerk     Windows State     Do Possible Manager     Control Manager	C Description			CORD	Custom Herd 5	
Network Device     Network Devices State     Devices State     Operations Manager     Synthetic Transaction     Web Application				- Court	Custom Head S	
Network Device     Network Devices State     Devices State     Operations Manager     Synthetic Transaction     Web Application					Custom Had a	
Network Device     Network Devices State     Devices State     Operations Manager     Synthetic Transaction     Web Application	40	Find Now Clear			U USKATIPALI S	
Network Device     Network Devices State     Devices State     Operations Manager     Synthetic Transaction     Web Application	Information Alerts (9)	Find Now Clear	Resolution State	Greated	Custom Field 6	
Eliza Network Device     Eliza Operation Nonager     Eliza Operation Nonager     Eliza Operation Renager     Eliza Operation Renager     Eliza Operation     Eliza Vehichel Transaction     Eliza Vehichel Nonaces     Windows Service And Process	Information Alerts (*)	Find New Clear				
El Control Device     El Netronik Device     El Netronik Devices     El Control Devices	Information Alerts (*) Lock for: Classifier Source: 192.168.1.74 (9)	Find Now Clear	Resolution State			
Konstrukt Device     Konstrukt Device     Konstrukt Devices     Konstrukt Devices     Konstrukt Transaction     Work Synthetic Transactin     Work Synthetic Transaction     Work Syn	Information Alerts (7)           Q Look fort           C Descripton           Source: 192.168.1.74 (9)           20/03/2009 05:06:55 - System P		Resolution State	Greated		
Konstrukt Device     Konstrukt Device     Konstrukt Devices     Konstrukt Devices     Konstrukt Transaction     Work Synthetic Transactin     Work Synthetic Transaction     Work Syn	Information Alerts (9)           Q Look fort           > Description           2000/2000 00:06:35 - System F           19/03/2009 17:28:27 - Sametime	4essage: GSKUN006/GSX (8) (UKLD0000 - Lond,	Resolution State New New	Greated 29/05/2009 05:06:02		
Konstrukt Device     Konstrukt Device     Konstrukt Devices     Konstrukt Devices     Konstrukt Transaction     Work Synthetic Transactin     Work Synthetic Transaction     Work Syn	Information Alerts         (9)           Look fort         (9)           © Description         (9)           19/03/2009 17:28:27 - Sentem         19/03/2009 17:11:125 - Sentem	Nessage: GSXUM06/GSX (8) (URLD0000 - Lond e up: gsxdemo.gox.net (GSX internal Chatserver)	Resolution State New New New	Created 20(03/2009 05:06+02 19(03/2009 17:29:18		
Kernek Devce     Kernek Devce     Kernek Devces	Information Alerts (2)           Lock fors           Description           Source: 192.168.1.74 (9)           20,03(200) 65.063.5.9yitem           19,03(200) 17.28:27 - Sometime           19,03(200) 17.11:25 - Sometime           19,03(200) 16:53:30 - Sometime	Nessager GSGLN085/GSX (8) (URLD0000 - Lond e up: gsidemo.gox.net (GSX internal Chat server) e up: gsidemo.gox.net (GSX internal Chat server)	Resolution State New New New New	Greated 29(05/2009 05:06:02 19(03/2009 17:29:18 19(03/2009 17:12:19		
Kernek Device     Kernek Device     Kernek Devices     Kernek Devices     Kernek Devices     Kernek Devices     Kernek Device	Information Alerts (?)           Lock fort           Discription           Source: 192.168.1.74 (?)           20/03/2000 05.06135 - System P           19/03/2000 12.8127 - Sometime           19/03/2000 15.8313 - Sometime           19/03/2000 16.8333 - Sometime           19/03/2000 16.8333 - Sometime           19/03/2000 16.23/21 - Sometime	Aesage: GSUM06/SSX (8) (URLD0000 - Lond e up: gosdemo.gox.net (GSX internal Chat server) e up: gosdemo.gox.net (GSX internal Chat server) e up: gosdemo.gox.net (GSX internal Chat server)	Resolution State New New New New	Created 29/03/2009 05:06:02 19/03/2009 17:29:18 19/03/2009 17:22:19 19/03/2009 16:53:19		
Kernek Devce     Kernek Devce     Kernek Devces	Information Alerts (?)           Lock for:           Disorbin           2000/2000 50:61:5 - System N           19/03/2009 17:20:27 - Sametime           19/03/2009 16:23:30 - Sametime           19/03/2009 16:23:30 - Sametime           19/03/2009 16:23:30 - Sametime           19/03/2009 16:23:12 - Sametime           19/03/2009 16:23:12 - Sametime           19/03/2009 16:23:12 - Sametime           19/03/2009 16:23:13 - Exchange	Nessage: GS4J/M06/GSX (8) (URLD0000 - Lond up: goxdemo.gox.net (GSX internal Chat server) up: goxdemo.gox.net (GSX internal Chat server) up: goxdemo.gox.net (GSX internal Chat server) up: goxdemo.gox.net (GSX internal Chat server)	Resolution State New New New New New New New	Created 29/03/2009 05:06:02 19/03/2009 17:29:18 19/03/2009 16:23:19 19/03/2009 16:23:14		
Metronic Device Metronic Device Metronic Devices Devices State Device Transaction Devices State Device Synthetic Transaction Device With Application Device With Application Device With Application Device The Metronic State Device State De	Information Alerts         (a)           Look fort         (b)           Cook fort         (c)           Description         (c)           Source:         192.168.1.74 (c)           903/2009 15.2812         Source:           903/2009 16.2813         Source:           903/2009 16.2813         Source:           903/2009 12.2813         Source:           903/2009 12.2814         Exchange           19/03/2009 12.2814         Source:           19/03/2009 12.2814         Source:           19/03/2009 12.2814         Source:	Aessage: GSILV006/GSX (8) (URLD0000 - Lond L up: gsidemo.gsx.net (GSX internal Chatserver) e up: GSX-EXC2003 (SVR: DUTBOUND)	Resolution State New New New New New New New New New	Created 20/03/2009 05:06+02 19/03/2009 17:29:18 19/03/2009 16:33:19 19/03/2009 16:33:19 19/03/2009 15:28:49		

Figure 18: Viewing SNMP Trap alerts in SCOM

GSX enables you designate by profile that alerts to escalate to SCOM. This allows you to alert the right team at the right moment, depending on the threshold you configure, to correct issues before they severely impact the business. It also enables you to centralize your alerts in SCOM, to optimize how they are processed.



# 4- Conclusion

The proliferation of SharePoint usage raises the dual concern of maintaining adequate service levels while controlling costs. The agentless, user-oriented approach of GSX Monitor & Analyzer, with full SCOM integration, provides a comprehensive and flexible solution to meet these ends.

In short, GSX provides an all-in-one solution to assure SharePoint delivery, while keeping a lid on costs.

# **Your Next Action**

To learn more about how GSX Monitor & Analyzer can monitor your SharePoint environment, register to our upcoming SharePoint webinars <a href="http://www.gsx.com/eventsnews/?Tag=GSX+">http://www.gsx.com/eventsnews/?Tag=GSX+</a>

Events or schedule a live demonstration with one of our experts <u>http://www.gsx.com/contact-us/request-a-demonstration-of-gsx-v10/</u>

Visit <u>http://www.gsx.net/resource\_center/technical\_support</u> for more information.

# GSX Solutions

sales@gsx.com





Download a free trial at www.gsx.com

Solutions

blog

© GSX Solutions