SAN MONITORING

Implementing ZABBIX in
Enterprise STORAGE AREA NETWORKS

Quadrata

about Quadrata

We are **IT specialists** with over 15 years experience in supporting **small/med Enterprise**

We accomplish our jobs using EXCLUSIVELY **Open-Source software**

We've been using **Zabbix since 2004**, version 1.0
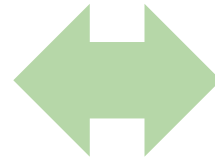
Our main partners are **HP, IBM and EMC**
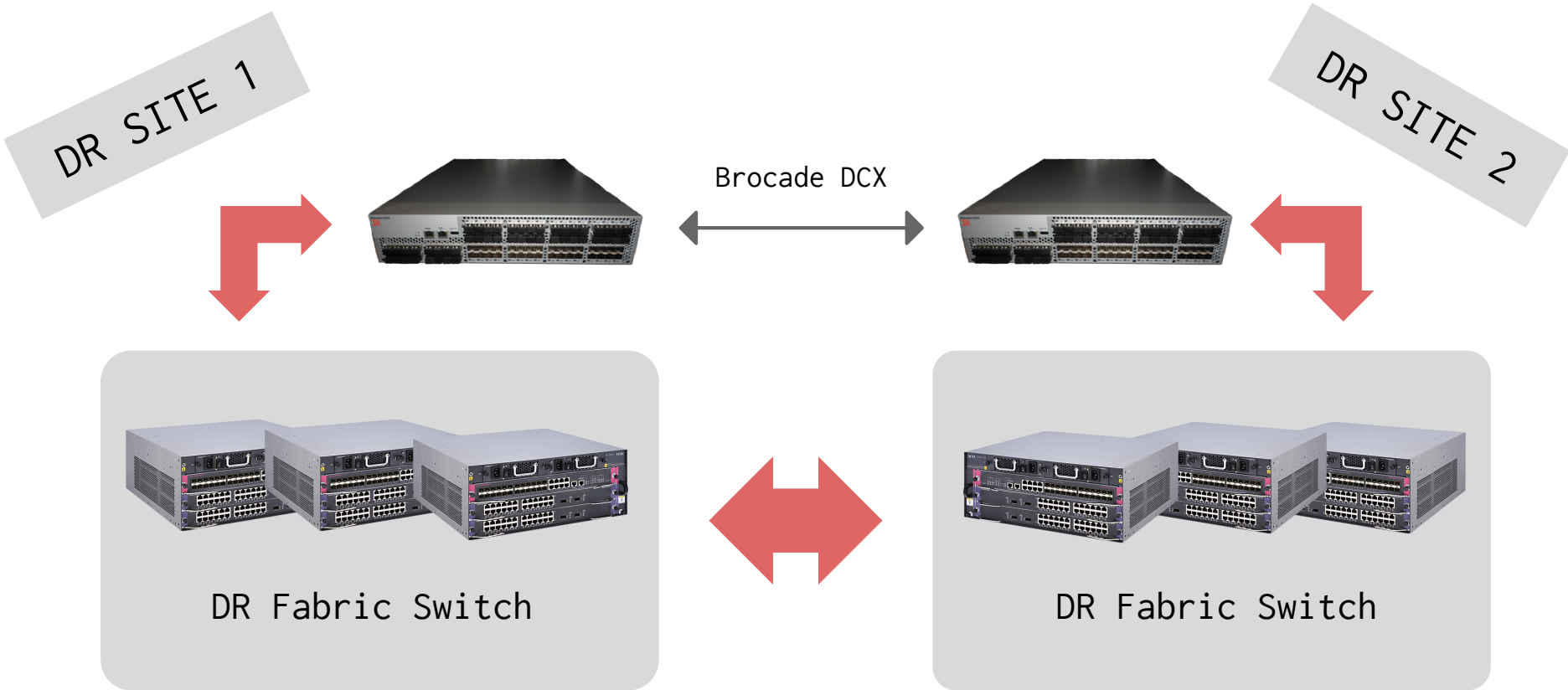
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Infrastructure High Availability

SITE 1

SITE 2

Brocade MPR

Brocade MPR

```
4 x Brocade DCX 8510 [640 ports x switch]
6 x Brocade 48000      [768 ports x switch]
4 x Brocade 4900       [128 ports x switch]
```

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Infrastructure Disaster Recovery

DR SITE 1

DR SITE 2

Brocade DCX

DR Fabric Switch

DR Fabric Switch

8 x Brocade DCX [640 ports x switch]

8 x Brocade 48000   [768 ports x switch]

Zabbix Server Details

Hardware

HP Proliant DL380 G7

CPU Quad Xeon E7330 (Quad Core)

RAM 64 GB

HDD SAN Storage HP 3Par T400

Software

Zabbix 2.0.9 (selected patches added)

MySQL 5.5.28 (partitioning activated)

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Zabbix Server Load

Parameter	Value	Details
Zabbix server is running	Yes	localhost:10051
Number of hosts (monitored/not monitored/templates)	690	578 / 61 / 51
Number of items (monitored/disabled/not supported)	343049	314046 / 5290 / 23713
Number of triggers (enabled/disabled)[problem/unknown/ok]	157377	113479 / 43898 [243 / 0 / 113236]
Number of users (online)	25	4
Required server performance, new values per second	907.74	-

High number of items discovered by LLD rules

Brocade LLD Rules
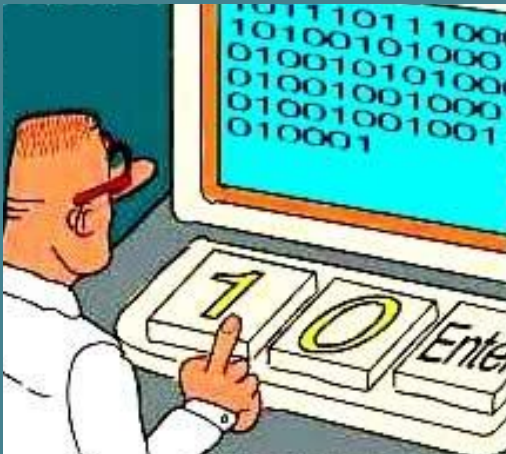
Name	Interfaces
Type	SNMPv3 agent
Key	keyInterfaces-IDX
SNMP OID	1.3.6.1.4.1.1588.2.1.1.1.6.2.1.37
Context name	VF:{$VFID}
SNMPv3 security name	admin
SNMPv3 security level	noAuthNoPriv
Port	
Update interval (in sec)	86400

Flexible intervals

Interval	Period	Action
No flexible intervals defined.		

New flexible interval	Interval (in sec)	50	Period	1-7,00:00-24:00	Add

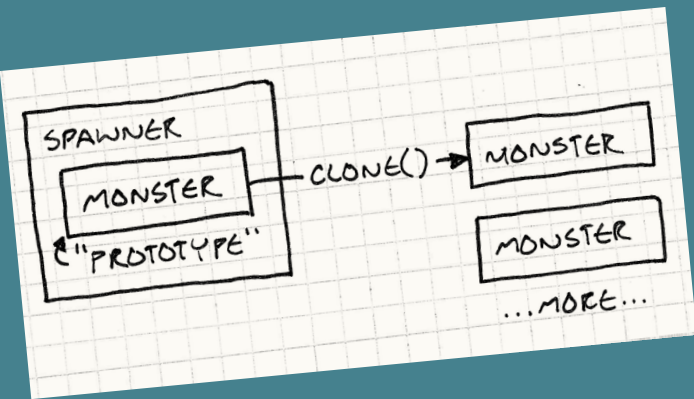| Keep lost resources period (in days)	30
Filter	Macro {#SWIDX} Regexp
Description	Discovery Virtual Switch Ports
Status	Enabled

Most of our items are discovered through SNMP protocol

www.quadrata.it

Brocade Items Prototype

Key	Interval	History	Trends	Type
connUnitPortHWState-[{#SWIDX}]	3600	7	15	SNMPv3 agent
connUnitPortSpeed-[{#SWIDX}]	3600	7	15	SNMPv3 agent
connUnitPortStatCountLossofSignal-[{#SWIDX}]	180	7	15	SNMPv3 agent
connUnitPortType-[{#SWIDX}]	300	7	15	SNMPv3 agent
fcFxPortInvalidCrcs-[{#SWIDX}]	180	7	15	SNMPv3 agent
fcFxPortLinkFailures-[{#SWIDX}]	180	7	15	SNMPv3 agent
fcFxPortNxPortName-[{#SWIDX}]	720	7		SNMPv3 agent
fcFxPortPhysOperStatus-[{#SWIDX}]	720	7	60	SNMPv3 agent
PortAttachedAlias-[{#SWIDX}]	0	7		Zabbix trapper
PortAttachedWWN-[{#SWIDX}]	0	7		Zabbix trapper
swFCPortRxWords-[{#SWIDX}]	120	7	15	SNMPv3 agent
swFCPortBrcdType-[{#SWIDX}]	3600	7	60	SNMPv3 agent
swFCPortC3Discards-[{#SWIDX}]	180	7	15	SNMPv3 agent
swFCPortLinkState-[{#SWIDX}]	3600	7	60	SNMPv3 agent
swFCPortName-[{#SWIDX}]	7200	7		SNMPv3 agent
swFCPortPhyState-[{#SWIDX}]	3600	7	60	SNMPv3 agent
swFCPortRxCrcs-[{#SWIDX}]	180	7	15	SNMPv3 agent
swFCPortRxEncOutFrs-[{#SWIDX}]	180	7	15	SNMPv3 agent
swFCPortSpeed-[{#SWIDX}]	36000	7	60	SNMPv3 agent
swSfpRxPower-[{#SWIDX}]	3600	7		SNMPv3 agent
swSfpTxPower-[{#SWIDX}]	3600	7		SNMPv3 agent
swFCPortTxWords-[{#SWIDX}]	120	7	15	SNMPv3 agent

Thousands of poor OIDs are constantly pinged by curious prototype clones...
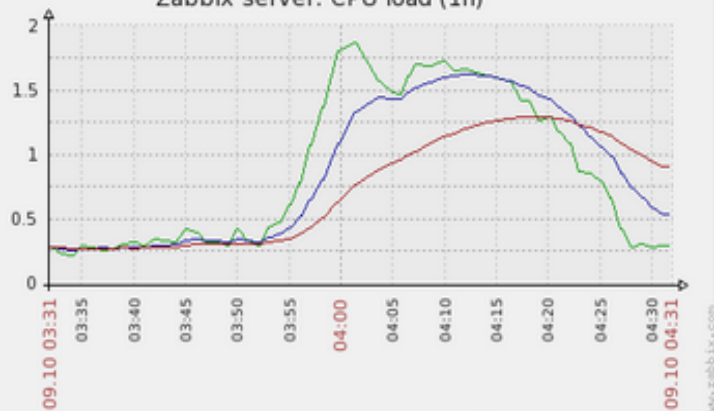
Latest Data

| Name ⬆	Last check	Last value
Brocade-Detail (6 Items)		
connUnitPortSpeed-[1/2]	08 Jul 2014 17:12:01	976.56 MBps
connUnitPortType-[1/2]	08 Jul 2014 17:37:03	f-port (8)
fcFxPortPhysOperStatus-[1/2]	08 Jul 2014 17:36:07	online (1)
swFCPortBrcdType-[1/2]	08 Jul 2014 17:12:08	f-port (4)
swFCPortName-[1/2]	08 Jul 2014 16:12:11	slot1 port2
swFCPortSpeed-[1/2]	08 Jul 2014 08:12:16	8Gb (5)
Brocade-Info (2 Items)		
PortAttachedAlias-[1/2]	08 Jul 2014 03:05:52	SALMOP10_B
PortAttachedWWN-[1/2]	08 Jul 2014 03:05:52	10:00:00:90:fa:17:b4 ...
Brocade-PortError (5 Items)		
fcFxPortInvalidCrcs-[1/2]	08 Jul 2014 17:39:04	1653
fcFxPortLinkFailures-[1/2]	08 Jul 2014 17:39:06	3
swFCPortC3Discards-[1/2]	08 Jul 2014 17:39:09	9
swFCPortRxCrcs-[1/2]	08 Jul 2014 17:39:13	1653
swFcPortRxEncOutFrs-[1/2]	08 Jul 2014 17:39:14	361366114
Brocade-PortIO (2 Items)		
RxWords-[1/2]	08 Jul 2014 17:38:16	127.89 KBps
TxWords-[1/2]	08 Jul 2014 17:38:17	40.04 KBps
Brocade-PortState (6 Items)		
connUnitPortHWState-[1/2]	08 Jul 2014 17:12:00	active (4)
connUnitPortStatCountLossofSignal-[1/2]	08 Jul 2014 17:39:02	4
swFCPortLinkState-[1/2]	08 Jul 2014 17:12:10	enabled (1)
swFCPortPhyState-[1/2]	08 Jul 2014 17:12:12	inSync (6)
swSfpRxPower-[1/2]	08 Jul 2014 17:12:18	-3.7
swSfpTxPower-[1/2]	08 Jul 2014 17:12:19	-2.6

... just to find out that they are absolutely healthy!

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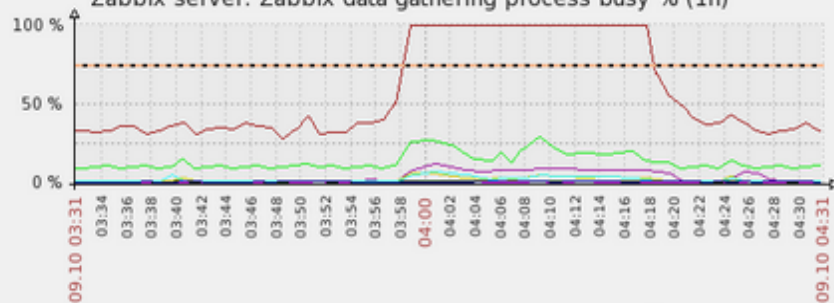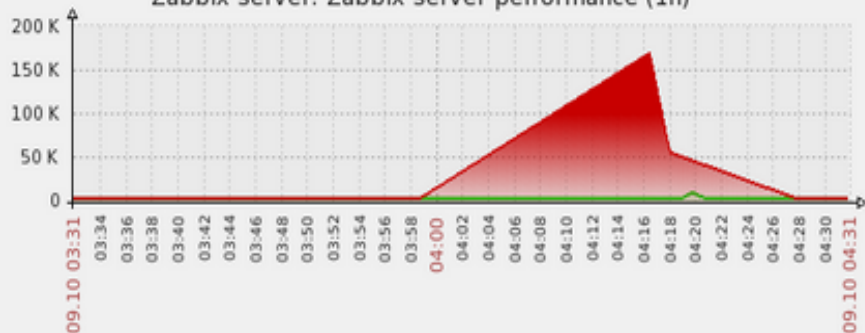
LLD Problems (v2.0.6)

Zabbix server: Zabbix internal process busy % (1h)

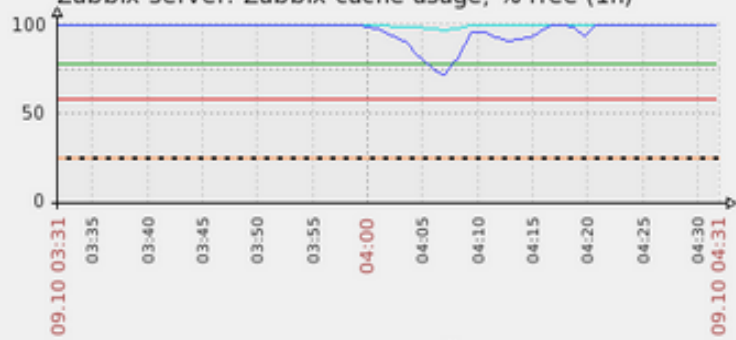Zabbix server: CPU load (1h)
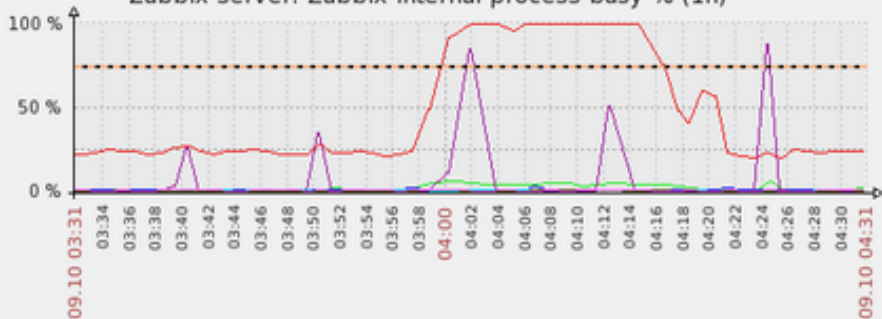
Zabbix server: Zabbix data gathering process busy % (1h)

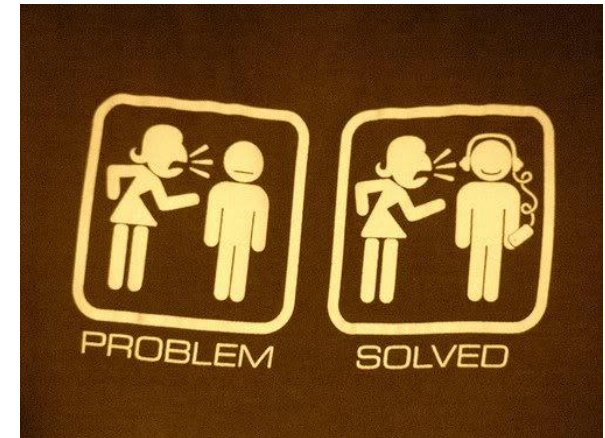Zabbix server: Zabbix server performance (1h)

Zabbix server: Zabbix cache usage, % free (1h)

Solved Problems

- Brocade **SNMP** v3 Context [**ZBXNEXT-1438**]

- **LLD Performance** improvements

- Better "**Value Map**" implementation

- Better **History Sync**

- Better **Zabbix Cache** implementation

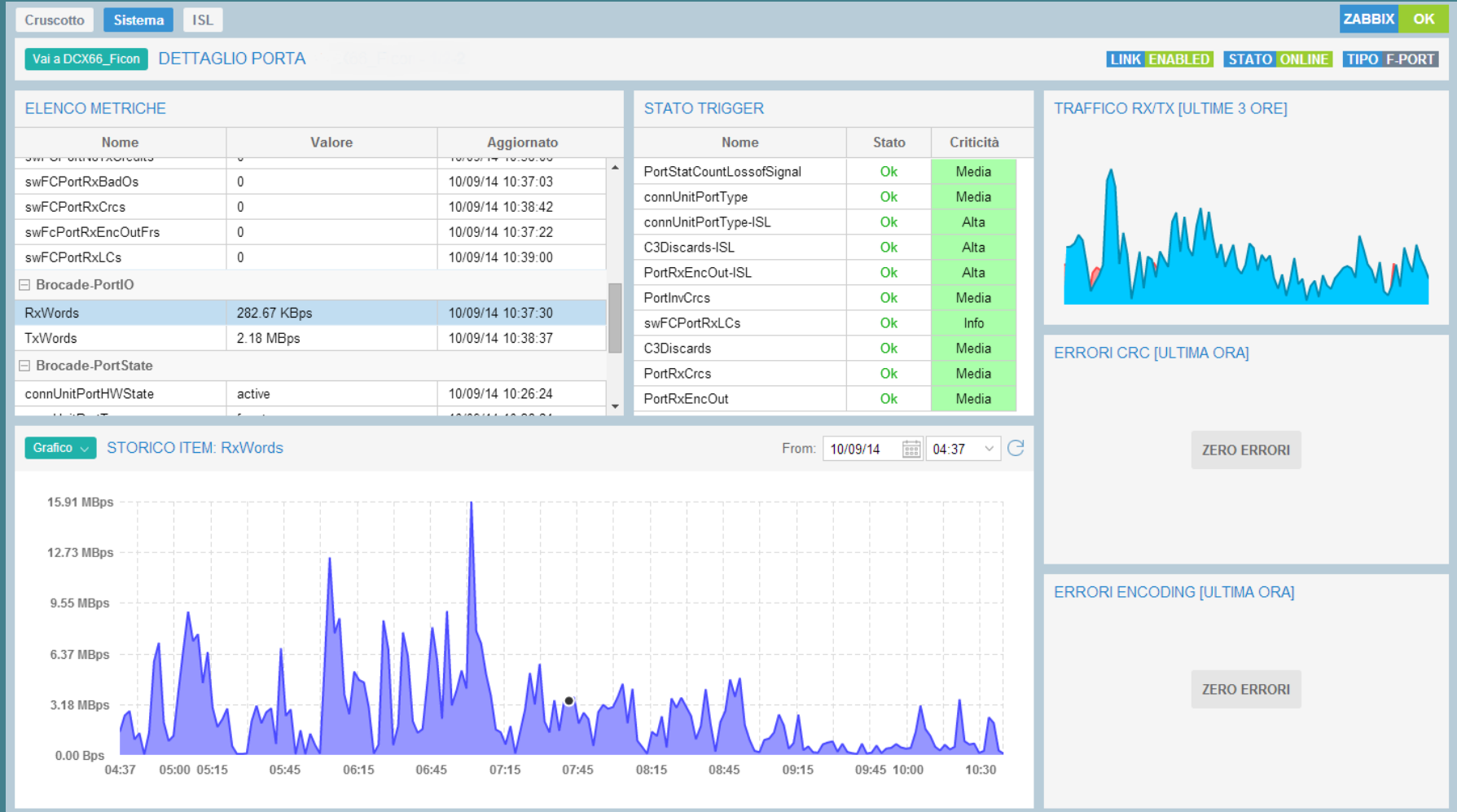# Pending Problems

- Very **slow "Latest Data" loading**; partially solved in v2.2.4 [**ZBX-7373**]

- Very **slow "Maps" loading** with lots of triggers

- **Wrong LLD Enable/Disable** design [**ZBX-6083**]; we prefer a new design : -)

we're sorry, something went very wrong!

Custom Developed Tools - Zabbix API

Custom dahsboard for simplified monitoring of **Brocade Switches**, entirely based on **Zabbix APIs**.
This is a switch port details view. It shows various port metrics and trigger status.
Traffic on port is showed aswell, through an interactive chart.

Custom Developed Tools - Zabbix API
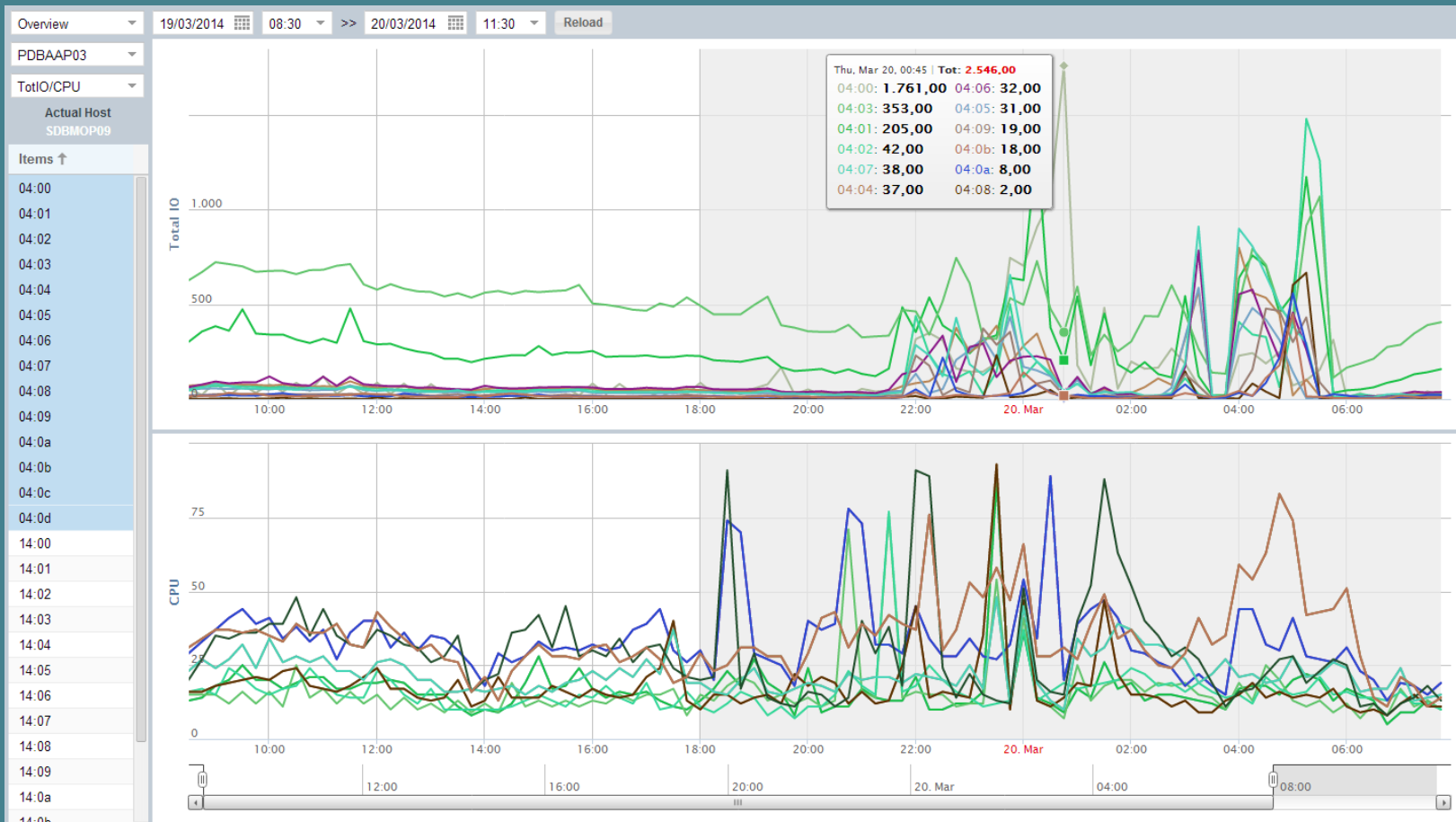
Custom dashboard to monitor **Storage Performance History**.
It analyzes various LDev metrics and compares them on time parallel charts.

Custom Developed Tools - Zabbix API

Host	Pool	Provisioned Capacity	Free Capacity	Pool Capacity	Usage Rate ↓	Subscription
	DWH_S	51.91 TB	1.14 TB	49.53 TB	97 %	104 %
	BACKUP	88.98 TB	2.37 TB	87.76 TB	97 %	101 %
	DWH_BC	47.99 TB	1.6 TB	43.87 TB	96 %	109 %
	DWH_BC	47.99 TB	1.44 TB	43.87 TB	96 %	109 %
	VP_Flash	0 TB	0.16 TB	3.22 TB	95 % (+1 %)	0 %
	VP_Flash	0 TB	0.19 TB	3.22 TB	94 %	0 %
	DWH_S	52.4 TB	3.48 TB	52.36 TB	93 %	100 %
	DWH_BC	51.18 TB	3.17 TB	50.99 TB	93 %	100 %
	BACKUP	89.05 TB	5.5 TB	90.89 TB	93 %	97 %
	BACKUP	89.29 TB	5.48 TB	90.89 TB	93 %	98 %
	3	26.03 TB	2 TB	28.03 TB	92 %	92 %
	DWH_BC	51.18 TB	4.36 TB	50.99 TB	91 %	100 %
	CRITICO	70.57 TB	3.55 TB (-2.21 GB)	43.54 TB	91 %	162 %
	CRITICO	70.57 TB	3.59 TB (-2.21 GB)	43.54 TB	91 %	162 %
	NON_CRITICO_4C	177.18 TB	14.14 TB (-0.12 GB)	150.44 TB	90 %	117 %
	R1_Sil_CCM	57.12 TB	6.63 TB	51 TB	87 %	112 %
	FNS_B	112.51 TB	12.78 TB	88.06 TB	85 %	127 %
	R3_Sil_CCM	56.1 TB	7.65 TB	51 TB	85 %	110 %
	0	61.43 TB	8.95 TB (-0.12 GB)	58.53 TB	84 %	104 %
	REPL_NON_CRITICO	174.48 TB	22.73 TB (-15.79 GB)	150.44 TB	84 %	115 %
	FNS_S	25.61 TB	4.42 TB (-1.6 GB)	25.68 TB	82 %	99 %
	CRITICO_4C	70.5 TB	8.96 TB (-0.04 GB)	51.37 TB	82 %	137 %
	R1_Gold_CCM	135.11 TB	20.79 TB	115.48 TB	82 %	117 %
	SILVER	58.21 TB	10.27 TB (-0.08 GB)	55.04 TB	81 %	105 %
	Pool	48.02 TB	12.79 TB	67.63 TB	81 %	71 %
	R3_Gold_Pr	129.34 TB	23.1 TB	115.48 TB	80 %	112 %
	DBT_B	81.95 TB	17.62 TB	86.23 TB	79 %	95 %
	SILVER	57.83 TB	11.72 TB (-0.49 GB)	56.87 TB	79 %	101 %
	R3_Sil_SET	43.27 TB	6.94 TB	33.03 TB	79 %	131 %

This is a grid showing **Storage Pools Status**.
It shows various metrics on Pools Capacity status. Can be grouped for Storage Box
or Infrastructure Area. A Print plugin is available.

Zabbix, the Good Parts

- **Customizable** (using Zabbix API)

- **Flexible**, we can monitor everything (custom dev)

- Good Data Interpolation (Triggers)

- Agent support for every enterprise SO

- Balanced support pricing, based on Zabbix Server setup (not for agents amount)

Zabbix, the Bad Parts

- Lack of **Reporting tools** (only available through custom dev, with Zabbix API)

- Not enough fancy and **ergonomic User Interface**

- No support for Enterprise monitoring protocol like **CIM**

- No Zabbix Server native **High Availability**

- Need of **easier scalability**