

Příloha 1

Monitoring pomocí SNMP

V této části přílohy jsou na obrázcích zobrazeny jednotlivé tabulky, které lze najít na Dashboardu monitorovacího systému Zabbix, pro dohled nad sítí. Jednotlivé tabulky se pak zobrazují na jedné stránce.

Recent Problems							...
Time	Info	Host	Problem • Severity	Duration	Ack	Actions	
11:52:23		OXS-HK-3NP-SW05	GigabitEthernet0/11 status changed to UP	5m 15s	No		
11:51:27		OXS-HK-WAN-SW02-MGMT	GigabitEthernet1/0/8 status changed to UP	6m 11s	No		
11:51:26		OXS-HK-WAN-SW01-MGMT	GigabitEthernet1/0/20 status changed to UP	6m 12s	No		
11:51:26		OXS-HK-WAN-SW01-MGMT	GigabitEthernet1/0/21 status changed to UP	6m 12s	No		
11:51:26		OXS-HK-WAN-SW01-MGMT	GigabitEthernet1/0/15 status changed to UP	6m 12s	No		
11:51:25		OXS-HK-DC01-SW02	Ethernet1/30 status changed to UP	6m 13s	No		
11:51:24		OXS-HK-DC01-SW01	Ethernet1/30 status changed to UP	6m 14s	No		
11:50:41		TEC-HK-DC01-SW02	Ethernet1/30 status changed to UP	6m 57s	No		
11:50:39		TEC-HK-DC01-SW01	Ethernet1/30 status changed to UP	6m 59s	No		
11:00							
09:16:38		SEC-HK-VCENTER	Free Space File System /storage/log -< 1%- on SEC-HK-VCENTER	2h 41m	No		
Today							
2018-04-08 04:15:56		Zabbix server	Free disk space is less than 20% on volume /	1d 7h 41m	No		
Yesterday							
2018-03-13 01:02:42		OXS-CST-NTAP8200	Free Size on Volume[oks_hk_dc_data_vol_mirror_vault] less than 10%	27d 9h 54m	No		
2018-03-08 12:57:37		OXS-HK-NTAP8200	Free Size on Volume[tec_hk_dc_fcso_fun] less than 10%	1m 1d 22h	No		

Obrázek 1: Dashboard – dosud nevyřešené problémy v síti

Problems History								...
Time	Recovery time	Status	Info	Host	Problem • Severity	Duration	Ack	Actions
11:52:27	11:54:27	RESOLVED		OXS-HK-WAN-SW02-MGMT	GigabitEthernet1/0/6 status changed to UP	2m	No	
11:52:23		PROBLEM		OXS-HK-3NP-SW05	GigabitEthernet0/11 status changed to UP	3m 54s	No	
11:51:27		PROBLEM		OXS-HK-WAN-SW02-MGMT	GigabitEthernet1/0/8 status changed to UP	4m 50s	No	
11:51:26		PROBLEM		OXS-HK-WAN-SW01-MGMT	GigabitEthernet1/0/20 status changed to UP	4m 51s	No	
11:51:26		PROBLEM		OXS-HK-WAN-SW01-MGMT	GigabitEthernet1/0/21 status changed to UP	4m 51s	No	
11:51:26		PROBLEM		OXS-HK-WAN-SW01-MGMT	GigabitEthernet1/0/15 status changed to UP	4m 51s	No	
11:51:25		PROBLEM		OXS-HK-DC01-SW02	Ethernet1/30 status changed to UP	4m 52s	No	
11:51:24		PROBLEM		OXS-HK-DC01-SW01	Ethernet1/30 status changed to UP	4m 53s	No	
11:50:41		PROBLEM		TEC-HK-DC01-SW02	Ethernet1/30 status changed to UP	5m 36s	No	
11:50:39		PROBLEM		TEC-HK-DC01-SW01	Ethernet1/30 status changed to UP	5m 38s	No	
11:42:27	11:44:27	RESOLVED		OXS-HK-WAN-SW02-MGMT	GigabitEthernet1/0/6 status changed to DOWN	2m	No	
11:41:35	11:46:05	RESOLVED		OXS-HK-FP01-primary	Unavailable by ICMP ping	4m 30s	No	
11:41:27	11:48:27	RESOLVED		OXS-HK-WAN-SW02-MGMT	GigabitEthernet1/0/8 status changed to DOWN	7m	No	
11:41:26	11:48:26	RESOLVED		OXS-HK-WAN-SW01-MGMT	GigabitEthernet1/0/21 status changed to DOWN	7m	No	
11:41:26	11:48:26	RESOLVED		OXS-HK-WAN-SW01-MGMT	GigabitEthernet1/0/15 status changed to DOWN	7m	No	
11:41:26	11:48:26	RESOLVED		OXS-HK-WAN-SW01-MGMT	GigabitEthernet1/0/20 status changed to DOWN	7m	No	
11:41:25	11:48:25	RESOLVED		OXS-HK-DC01-SW02	Ethernet1/30 status changed to DOWN	7m	No	
11:41:24	11:49:24	RESOLVED		OXS-HK-DC01-SW01	Ethernet1/30 status changed to DOWN	8m	No	
11:40:41	11:48:41	RESOLVED		TEC-HK-DC01-SW02	Ethernet1/30 status changed to DOWN	8m	No	
11:40:39	11:48:39	RESOLVED		TEC-HK-DC01-SW01	Ethernet1/30 status changed to DOWN	8m	No	

100 of 1000+ problems are shown Updated: 11:56:18

Obrázek 2: Dashboard – historie problému



Obrázek 3: Dashboard – status systému

Status of Zabbix ...		
Parameter	Value	Details
Zabbix server is running	Yes	localhost:10051
Number of hosts (enabled/disabled/templates)	177	86 / 2 / 89
Number of items (enabled/disabled/not supported)	8078	7881 / 87 / 110
Number of triggers (enabled/disabled [problem/ok])	4760	4698 / 62 [9 / 4689]
Number of users (online)	7	1
Required server performance, new values per second	123.96	
Updated: 08:03:17		

Obrázek 4: Dashboard – status Zabbix serveru

Ukázka části přidanych hostů

V této části přílohy jsou zobrazena část přidanych hostů. U každého hostu je zobrazeno, kolik je na něm vytvořeno aplikací, počet monitorovaných itemů, počet nastavených triggerů, grafů a kolik je nastaveno pravidel pro discovery. Dále jsou u každého hosta vypsány jednotlivé Templatey, které má daný host přiřazené. Je zde také vidět, zda je daný host povolený a jakým způsobem je monitorován (v této části jsou hosti monitorováni pomocí SNMP).

☐	OKS-CST-DC01-RT01	Applications 9	Items 112	Triggers 42	Graphs 17	Discovery 7	Web	10.252.193.7:10050	Cisco Interface Discovery, Template Module Cisco CISCO-ENVMON-MIB SNMPv2, Template Module ICMP Ping, Template Net Cisco IOS SNMPv2_TEST (Template Module Cisco CISCO-MEMORY-POOL-MIB SNMPv2, Template Module Cisco CISCO-PROCESS-MIB SNMPv2, Template Module Cisco Inventory SNMPv2, Template Module Generic SNMPv2_TEST)	Enabled	ZBX	SNMP	JMX	IPMI	NONE
☐	OKS-CST-DC01-RT02	Applications 9	Items 52	Triggers 22	Graphs 7	Discovery 7	Web	10.252.193.8:10050	Cisco Interface Discovery, Template Module Cisco CISCO-ENVMON-MIB SNMPv2, Template Module ICMP Ping, Template Net Cisco IOS SNMPv2_TEST (Template Module Cisco CISCO-MEMORY-POOL-MIB SNMPv2, Template Module Cisco CISCO-PROCESS-MIB SNMPv2, Template Module Cisco Inventory SNMPv2, Template Module Generic SNMPv2_TEST)	Enabled	ZBX	SNMP	JMX	IPMI	NONE
☐	OKS-CST-DC01-SW01	Applications 8	Items 313	Triggers 114	Graphs 50	Discovery 7	Web	10.252.193.4:10050	Cisco Interface Discovery, Cisco Nexus FRU (PowerSupply, Fan, Temp), Template Module Cisco CISCO-ENVMON-MIB SNMPv2, Template Module Cisco CISCO-PROCESS-MIB SNMPv2, Template Module Generic SNMPv2_TEST, Template Module ICMP Ping	Enabled	ZBX	SNMP	JMX	IPMI	NONE
☐	OKS-CST-DC01-SW02	Applications 8	Items 313	Triggers 114	Graphs 50	Discovery 7	Web	10.252.193.5:10050	Cisco Interface Discovery, Cisco Nexus FRU (PowerSupply, Fan, Temp), Template Module Cisco CISCO-ENVMON-MIB SNMPv2, Template Module Cisco CISCO-PROCESS-MIB SNMPv2, Template Module Generic SNMPv2_TEST, Template Module ICMP Ping	Enabled	ZBX	SNMP	JMX	IPMI	NONE
☐	OKS-CST-DC01-SWMGMT	Applications 9	Items 193	Triggers 72	Graphs 31	Discovery 7	Web	10.252.193.6:10050	Cisco Interface Discovery, Template Module Cisco CISCO-ENVMON-MIB SNMPv2, Template Module ICMP Ping, Template Net Cisco IOS SNMPv2_TEST (Template Module Cisco CISCO-MEMORY-POOL-MIB SNMPv2, Template Module Cisco CISCO-PROCESS-MIB SNMPv2, Template Module Cisco Inventory SNMPv2, Template Module Generic SNMPv2_TEST)	Enabled	ZBX	SNMP	JMX	IPMI	NONE
☐	OKS-CST-ESX1	Applications 7	Items 92	Triggers 4	Graphs	Discovery 5	Web	10.252.193.37:10050	Template Module ICMP Ping, Template SNMP ESX	Enabled	ZBX	SNMP	JMX	IPMI	NONE
☐	OKS-CST-ESX2	Applications 7	Items 92	Triggers 4	Graphs	Discovery 5	Web	10.252.193.38:10050	Template Module ICMP Ping, Template SNMP ESX	Enabled	ZBX	SNMP	JMX	IPMI	NONE
☐	OKS-CST-ESX3	Applications 7	Items 100	Triggers 8	Graphs	Discovery 5	Web	10.252.193.39:10050	Template Module ICMP Ping, Template SNMP ESX	Enabled	ZBX	SNMP	JMX	IPMI	NONE
☐	OKS-CST-ESX4	Applications 7	Items 92	Triggers 4	Graphs	Discovery 5	Web	10.252.193.40:10050	Template Module ICMP Ping, Template SNMP ESX	Enabled	ZBX	SNMP	JMX	IPMI	NONE
☐	OKS-CST-NTAP8200	Applications 7	Items 179	Triggers 55	Graphs	Discovery 5	Web	10.252.193.10:10050	Template Module ICMP Ping, Template SNMP NetApp cDot	Enabled	ZBX	SNMP	JMX	IPMI	NONE
☐	OKS-CST-NTAP8200-01	Applications 1	Items 3	Triggers 3	Graphs	Discovery	Web	10.252.193.11:10050	Template Module ICMP Ping	Enabled	ZBX	SNMP	JMX	IPMI	NONE

Obrázek 5: Výpis některých přidanych hostů na Zabbix serveru

Monitoring hosta OKS-HK-DC01-SW01 (latest data) a vytvořené triggery

V této části jsou zobrazeny jednotlivé itemy a vytvořené triggery pro hosta (switch) OKS-HK-3NP-SW04. Obrázek 6 a Obrázek 7 zobrazují Latest data hosta výše. Latest data jsou zde záměrně, protože kdyby zde byly zobrazeny pouze itemy, nebylo by z obrázků vidět, které hodnoty jsou vyčítány. Sloupec Last value zobrazuje poslední vyčtenou hodnotu z hosta. Obrázek 8 a Obrázek 9 zobrazují nastavené triggery a jejich závislosti na jiné triggeru. Z obrázků je také vidět v jakém případě se trigger spustí (je vidět syntaxe triggeru).

☐ Name ▲	Last check	Last value	Change
▼ CPU (1 Item)			
☐ # CPU utilization	2018-05-14 09:03:24	1 %	Graph
▼ Fans (4 Items)			
☐ FanModule-1	2018-05-14 09:03:25	on (2)	History
☐ FanModule-2	2018-05-14 09:03:24	on (2)	History
☐ FanModule-3	2018-05-14 09:03:25	on (2)	History
☐ FanModule-4	2018-05-14 09:03:24	on (2)	History
▼ General (5 Items)			
☐ Device contact details	2018-05-14 09:01:24	who@where	History
☐ Device description	2018-05-14 09:01:24	Cisco NX-OS(tm) n3500...	History
☐ Device location	2018-05-14 09:01:24	snmplocation	History
☐ Device name	2018-05-14 09:01:24	OKS-HK-DC01-SW01	History
☐ System object ID	2018-05-14 09:01:24	CISCO-SMI::ciscoModul...	History
▼ Interface (336 Items)			
☐ Ethernet1/1: Interface	2018-05-14 09:03:24	Ethernet1/1	History
☐ Ethernet1/1: Interface Input	2018-05-14 09:03:24	360.76 Kbits	-17.73 Kbits Graph
☐ Ethernet1/1: Interface Input Drop	2018-05-14 09:03:25	0 packets	Graph
☐ Ethernet1/1: Interface Output	2018-05-14 09:03:24	24.48 Kbits	-92.28 Kbits Graph
☐ Ethernet1/1: Interface Output Drop	2018-05-14 09:03:25	0 packets	Graph
☐ Ethernet1/1: Interface Speed	2018-05-14 09:03:24	4.29 Gbits	Graph
☐ Ethernet1/1: Interface Status	2018-05-14 09:03:24	up (1)	Graph
☐ Ethernet1/2: Interface	2018-05-14 09:03:25	Ethernet1/2	History
☐ Ethernet1/2: Interface Input	2018-05-14 09:03:25	198.93 Kbits	+17.56 Kbits Graph
☐ Ethernet1/2: Interface Input Drop	2018-05-14 09:03:24	0 packets	Graph
☐ Ethernet1/2: Interface Output	2018-05-14 09:03:24	117.69 Kbits	+66.23 Kbits Graph
☐ Ethernet1/2: Interface Output Drop	2018-05-14 09:03:24	0 packets	Graph
☐ Ethernet1/2: Interface Speed	2018-05-14 09:03:24	4.29 Gbits	Graph
☐ Ethernet1/2: Interface Status	2018-05-14 09:03:25	up (1)	Graph
☐ Ethernet1/3: Interface	2018-05-14 09:03:25	Ethernet1/3	History
☐ Ethernet1/3: Interface Input	2018-05-14 09:03:24	0 bits	Graph
☐ Ethernet1/3: Interface Input Drop	2018-05-14 09:03:24	0 packets	Graph
☐ Ethernet1/3: Interface Output	2018-05-14 09:03:24	0 bits	Graph
☐ Ethernet1/3: Interface Output Drop	2018-05-14 09:03:25	0 packets	Graph
☐ Ethernet1/3: Interface Speed	2018-05-14 09:03:24	4.29 Gbits	Graph
☐ Ethernet1/3: Interface Status	2018-05-14 09:03:24	down (2)	Graph
☐ Ethernet1/4: Interface	2018-05-14 09:03:24	Ethernet1/4	History
☐ Ethernet1/4: Interface Input	2018-05-14 09:03:24	0 bits	Graph
☐ Ethernet1/4: Interface Input Drop	2018-05-14 09:03:24	0 packets	Graph
☐ Ethernet1/4: Interface Output	2018-05-14 09:03:24	0 bits	Graph
☐ Ethernet1/4: Interface Output Drop	2018-05-14 09:03:25	0 packets	Graph
☐ Ethernet1/4: Interface Speed	2018-05-14 09:03:25	4.29 Gbits	Graph
☐ Ethernet1/4: Interface Status	2018-05-14 09:03:24	down (2)	Graph
☐ Ethernet1/5: Interface	2018-05-14 09:03:25	Ethernet1/5	History
☐ Ethernet1/5: Interface Input	2018-05-14 09:03:24	147.31 Kbits	-102.78 Kbits Graph
☐ Ethernet1/5: Interface Input Drop	2018-05-14 09:03:25	0 packets	Graph
☐ Ethernet1/5: Interface Output	2018-05-14 09:03:25	249.29 Kbits	+862.34 bits Graph
☐ Ethernet1/5: Interface Output Drop	2018-05-14 09:03:24	0 packets	Graph
☐ Ethernet1/5: Interface Speed	2018-05-14 09:03:25	4.29 Gbits	Graph

Obrázek 6: Latest data pro zařízení SW OKS-HK-DC01-SW01(první část)

☒ Ethernet1/45: Interface	2018-05-14 09:04:24	Ethernet1/45		History
☐ Ethernet1/45: Interface Input	2018-05-14 09:04:24	0 bits		Graph
☐ Ethernet1/45: Interface Input Drop	2018-05-14 09:04:24	0 packets		Graph
☐ Ethernet1/45: Interface Output	2018-05-14 09:04:25	0 bits		Graph
☐ Ethernet1/45: Interface Output Drop	2018-05-14 09:04:24	0 packets		Graph
☐ Ethernet1/45: Interface Speed	2018-05-14 09:04:24	4.29 Gbits		Graph
☐ Ethernet1/45: Interface Status	2018-05-14 09:04:24	down (2)		Graph
☒ Ethernet1/46: Interface	2018-05-14 09:04:25	Ethernet1/46		History
☐ Ethernet1/46: Interface Input	2018-05-14 09:04:24	0 bits		Graph
☐ Ethernet1/46: Interface Input Drop	2018-05-14 09:04:24	0 packets		Graph
☐ Ethernet1/46: Interface Output	2018-05-14 09:04:24	0 bits		Graph
☐ Ethernet1/46: Interface Output Drop	2018-05-14 09:04:24	0 packets		Graph
☐ Ethernet1/46: Interface Speed	2018-05-14 09:04:25	4.29 Gbits		Graph
☐ Ethernet1/46: Interface Status	2018-05-14 09:04:24	down (2)		Graph
☒ Ethernet1/47: Interface	2018-05-14 09:04:25	Ethernet1/47		History
☐ Ethernet1/47: Interface Input	2018-05-14 09:04:25	0 bits		Graph
☐ Ethernet1/47: Interface Input Drop	2018-05-14 09:04:24	0 packets		Graph
☐ Ethernet1/47: Interface Output	2018-05-14 09:04:24	0 bits		Graph
☐ Ethernet1/47: Interface Output Drop	2018-05-14 09:04:25	0 packets		Graph
☐ Ethernet1/47: Interface Speed	2018-05-14 09:04:25	4.29 Gbits		Graph
☐ Ethernet1/47: Interface Status	2018-05-14 09:04:24	down (2)		Graph
☒ Ethernet1/48: Interface	2018-05-14 09:04:24	Ethernet1/48		History
☐ Ethernet1/48: Interface Input	2018-05-14 09:04:24	0 bits		Graph
☐ Ethernet1/48: Interface Input Drop	2018-05-14 09:04:25	0 packets		Graph
☐ Ethernet1/48: Interface Output	2018-05-14 09:04:24	0 bits		Graph
☐ Ethernet1/48: Interface Output Drop	2018-05-14 09:04:25	0 packets		Graph
☐ Ethernet1/48: Interface Speed	2018-05-14 09:04:24	4.29 Gbits		Graph
☐ Ethernet1/48: Interface Status	2018-05-14 09:04:24	down (2)		Graph
▼ Memory (3 Items)				
☐ Available Memory	2018-05-14 01:00:44	3.53 GB		Graph
☐ Memory Free	2018-05-14 09:04:24	1.17 GB	+449.22 KB	Graph
☐ Memory Used	2018-05-14 09:04:24	2.36 GB	-449.22 KB	Graph
▼ Power Supply (2 Items)				
☒ PowerSupply-1	2018-05-14 09:04:54	on (2)		History
☒ PowerSupply-2	2018-05-14 09:04:54	on (2)		History
▼ Status (5 Items)				
☐ Device uptime	2018-05-14 09:04:54	99 days, 14:48:43	+00:00:30	Graph
☐ ICMP loss	2018-05-14 09:05:02	0 %		Graph
☐ ICMP ping	2018-05-14 09:05:02	Up (1)		Graph
☐ ICMP response time	2018-05-14 09:05:02	5.7ms		Graph
☐ SNMP availability	2018-05-14 09:04:40	available (1)		Graph
▼ Temperature (4 Items)				
☐ ASIC Temperature sensor status	2018-05-14 09:04:25	ok (1)		Graph
☐ ASIC Temperature Value	2018-05-14 09:04:24	41 °C		Graph
☐ Intake Temperature sensor status	2018-05-14 09:04:24	ok (1)		Graph
☐ Intake Temperature Value	2018-05-14 09:04:25	26 °C		Graph

Obrázek 7: Latest data pro zařízení SW OKS-HK-DC01-SW01(druhá část)

☐	Severity	Name ▲	Expression	Status	Info
☐	Average	Cisco Nexus FRU (PowerSupply, Fan, Temp): CPU utilization is above warning threshold > 75% Depends on: OKS-HK-DC01-SW01: CPU utilization is above warning threshold > 90%	Problem: {OKS-HK-DC01-SW01:cisco.nexus.system.cpu.util[cisNexSysCpuUtil].last(#3)}>75 Recovery: {OKS-HK-DC01-SW01:cisco.nexus.system.cpu.util[cisNexSysCpuUtil].last(#5)}<75	Enabled	
☐	High	Cisco Nexus FRU (PowerSupply, Fan, Temp): CPU utilization is above warning threshold > 90% Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	Problem: {OKS-HK-DC01-SW01:cisco.nexus.system.cpu.util[cisNexSysCpuUtil].last(#3)}>90 Recovery: {OKS-HK-DC01-SW01:cisco.nexus.system.cpu.util[cisNexSysCpuUtil].last(#5)}<90	Enabled	
☐	Warning	Interface Discovery: Ethernet1/1 Alias: INPUT is over 50% maximum interface speed Depends on: OKS-HK-DC01-SW01: Ethernet1/1 Alias: INPUT is over 90% maximum interface speed	{OKS-HK-DC01-SW01:cisco.inter.input[ciscIntMonInput.436207616].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436207616].last())*0.50)	Enabled	
☐	High	Interface Discovery: Ethernet1/1 Alias: INPUT is over 90% maximum interface speed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.input[ciscIntMonInput.436207616].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436207616].last())*0.90)	Enabled	
☐	Warning	Interface Discovery: Ethernet1/1 Alias: OUTPUT is over 50% maximum interface speed Depends on: OKS-HK-DC01-SW01: Ethernet1/1 Alias: OUTPUT is over 90% maximum interface speed	{OKS-HK-DC01-SW01:cisco.inter.output[ciscIntMonOutput.436207616].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436207616].last())*0.50)	Enabled	
☐	High	Interface Discovery: Ethernet1/1 Alias: OUTPUT is over 90% maximum interface speed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.output[ciscIntMonOutput.436207616].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436207616].last())*0.90)	Enabled	
☐	Information	Interface Discovery: Ethernet1/1 Alias: status changed to DOWN Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.status[ciscIntMonStatus.436207616].last()}>{OKS-HK-DC01-SW01:cisco.inter.status[ciscIntMonStatus.436207616].last(),10m}	Enabled	
☐	Information	Interface Discovery: Ethernet1/1 Alias: status changed to UP Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.status[ciscIntMonStatus.436207616].last()}<{OKS-HK-DC01-SW01:cisco.inter.status[ciscIntMonStatus.436207616].last(),10m}	Enabled	
☐	Warning	Interface Discovery: Ethernet1/2 Alias: INPUT is over 50% maximum interface speed Depends on: OKS-HK-DC01-SW01: Ethernet1/2 Alias: INPUT is over 90% maximum interface speed	{OKS-HK-DC01-SW01:cisco.inter.input[ciscIntMonInput.436211712].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436211712].last())*0.50)	Enabled	
☐	High	Interface Discovery: Ethernet1/2 Alias: INPUT is over 90% maximum interface speed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.input[ciscIntMonInput.436211712].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436211712].last())*0.90)	Enabled	
☐	Warning	Interface Discovery: Ethernet1/2 Alias: OUTPUT is over 50% maximum interface speed Depends on: OKS-HK-DC01-SW01: Ethernet1/2 Alias: OUTPUT is over 90% maximum interface speed	{OKS-HK-DC01-SW01:cisco.inter.output[ciscIntMonOutput.436211712].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436211712].last())*0.50)	Enabled	
☐	High	Interface Discovery: Ethernet1/2 Alias: OUTPUT is over 90% maximum interface speed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.output[ciscIntMonOutput.436211712].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436211712].last())*0.90)	Enabled	
☐	Information	Interface Discovery: Ethernet1/2 Alias: status changed to DOWN Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.status[ciscIntMonStatus.436211712].last()}>{OKS-HK-DC01-SW01:cisco.inter.status[ciscIntMonStatus.436211712].last(),10m}	Enabled	
☐	Information	Interface Discovery: Ethernet1/2 Alias: status changed to UP Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.status[ciscIntMonStatus.436211712].last()}<{OKS-HK-DC01-SW01:cisco.inter.status[ciscIntMonStatus.436211712].last(),10m}	Enabled	
☐	Warning	Interface Discovery: Ethernet1/3 Alias: INPUT is over 50% maximum interface speed Depends on: OKS-HK-DC01-SW01: Ethernet1/3 Alias: INPUT is over 90% maximum interface speed	{OKS-HK-DC01-SW01:cisco.inter.input[ciscIntMonInput.436215808].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436215808].last())*0.50)	Enabled	
☐	High	Interface Discovery: Ethernet1/3 Alias: INPUT is over 90% maximum interface speed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.input[ciscIntMonInput.436215808].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436215808].last())*0.90)	Enabled	
☐	Warning	Interface Discovery: Ethernet1/3 Alias: OUTPUT is over 50% maximum interface speed Depends on: OKS-HK-DC01-SW01: Ethernet1/3 Alias: OUTPUT is over 90% maximum interface speed	{OKS-HK-DC01-SW01:cisco.inter.output[ciscIntMonOutput.436215808].last(60)}>((OKS-HK-DC01-SW01:cisco.inter.speed[ciscIntSpeed.436215808].last())*0.50)	Enabled	

Obrázek 8: Výpis části triggerů na zařízení SW OKS-HK-DC01-SW01(první část)

☐	High	Interface Discovery: Ethernet1/47 Alias: OUTPUT is over 90% maximum interface speed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.output[ciscointMonOutput.436396032].last(60)}>{(OKS-HK-DC01-SW01:cisco.inter.speed[ciscointSpeed.436396032].last(1))*0.90}	Enabled	
☐	Information	Interface Discovery: Ethernet1/47 Alias: status changed to DOWN Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.status[ciscointMonStatus.436396032].last(1)}>{(OKS-HK-DC01-SW01:cisco.inter.status[ciscointMonStatus.436396032].last(10m))}	Enabled	
☐	Information	Interface Discovery: Ethernet1/47 Alias: status changed to UP Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.status[ciscointMonStatus.436396032].last(1)}<{(OKS-HK-DC01-SW01:cisco.inter.status[ciscointMonStatus.436396032].last(10m))}	Enabled	
☐	Warning	Interface Discovery: Ethernet1/48 Alias: INPUT is over 50% maximum interface speed Depends on: OKS-HK-DC01-SW01: Ethernet1/48 Alias: INPUT is over 90% maximum interface speed	{OKS-HK-DC01-SW01:cisco.inter.input[ciscointMonInput.436400128].last(60)}>{(OKS-HK-DC01-SW01:cisco.inter.speed[ciscointSpeed.436400128].last(1))*0.50}	Enabled	
☐	High	Interface Discovery: Ethernet1/48 Alias: INPUT is over 90% maximum interface speed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.input[ciscointMonInput.436400128].last(60)}>{(OKS-HK-DC01-SW01:cisco.inter.speed[ciscointSpeed.436400128].last(1))*0.90}	Enabled	
☐	Warning	Interface Discovery: Ethernet1/48 Alias: OUTPUT is over 50% maximum interface speed Depends on: OKS-HK-DC01-SW01: Ethernet1/48 Alias: OUTPUT is over 90% maximum interface speed	{OKS-HK-DC01-SW01:cisco.inter.output[ciscointMonOutput.436400128].last(60)}>{(OKS-HK-DC01-SW01:cisco.inter.speed[ciscointSpeed.436400128].last(1))*0.50}	Enabled	
☐	High	Interface Discovery: Ethernet1/48 Alias: OUTPUT is over 90% maximum interface speed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.output[ciscointMonOutput.436400128].last(60)}>{(OKS-HK-DC01-SW01:cisco.inter.speed[ciscointSpeed.436400128].last(1))*0.90}	Enabled	
☐	Information	Interface Discovery: Ethernet1/48 Alias: status changed to DOWN Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.status[ciscointMonStatus.436400128].last(1)}>{(OKS-HK-DC01-SW01:cisco.inter.status[ciscointMonStatus.436400128].last(10m))}	Enabled	
☐	Information	Interface Discovery: Ethernet1/48 Alias: status changed to UP Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.inter.status[ciscointMonStatus.436400128].last(1)}<{(OKS-HK-DC01-SW01:cisco.inter.status[ciscointMonStatus.436400128].last(10m))}	Enabled	
☐	High	Fan Discovery: FanModule-1 is in critical state or failed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:nexus.fan.discovery[nexusFanDiscovery.534].last(#3)}=1 or {OKS-HK-DC01-SW01:nexus.fan.discovery[nexusFanDiscovery.534].last(#3)}>2	Enabled	
☐	High	Fan Discovery: FanModule-2 is in critical state or failed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:nexus.fan.discovery[nexusFanDiscovery.535].last(#3)}=1 or {OKS-HK-DC01-SW01:nexus.fan.discovery[nexusFanDiscovery.535].last(#3)}>2	Enabled	
☐	High	Fan Discovery: FanModule-3 is in critical state or failed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:nexus.fan.discovery[nexusFanDiscovery.536].last(#3)}=1 or {OKS-HK-DC01-SW01:nexus.fan.discovery[nexusFanDiscovery.536].last(#3)}>2	Enabled	
☐	High	Fan Discovery: FanModule-4 is in critical state or failed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:nexus.fan.discovery[nexusFanDiscovery.537].last(#3)}=1 or {OKS-HK-DC01-SW01:nexus.fan.discovery[nexusFanDiscovery.537].last(#3)}>2	Enabled	
☐	Warning	Template Module ICMP Ping: High ICMP ping loss Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:icmpingloss.min(5m)}>\${ICMP_LOSS_WARN} and {OKS-HK-DC01-SW01:icmpingloss.min(5m)}<100	Enabled	
☐	Warning	Template Module ICMP Ping: High ICMP ping response time Depends on: OKS-HK-DC01-SW01: High ICMP ping loss OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:icmpingsec.avg(5m)}>\${ICMP_RESPONSE_TIME_WARN}	Enabled	
☐	High	Cisco Nexus FRU (PowerSupply, Fan, Temp): Memory usage is above warning threshold > 80% Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:cisco.nexus.memory.used[ciscoNexusMemoryUsed].last(0)}>{(OKS-HK-DC01-SW01:cisco.nexus.memory.avail[ciscoNexusMemoryAvail].last(0))*0.8}	Enabled	
☐	Warning	Template Module Generic SNMPv2_TEST: No SNMP data collection	{OKS-HK-DC01-SW01:zabbix[host.snmp.available].max((\$SNMP_TIMEOUT))}=0	Enabled	
☐	High	PowerSupply Discovery: PowerSupply-1 is in critical state or failed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:nexus.ps.discovery[nexusPSDiscovery.470].last(1)}=1 or {OKS-HK-DC01-SW01:nexus.ps.discovery[nexusPSDiscovery.470].last(1)}>2	Enabled	
☐	High	PowerSupply Discovery: PowerSupply-2 is in critical state or failed Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:nexus.ps.discovery[nexusPSDiscovery.471].last(1)}=1 or {OKS-HK-DC01-SW01:nexus.ps.discovery[nexusPSDiscovery.471].last(1)}>2	Enabled	
☐	Severity	Name ▲	Expression	Status	Info
☐	Average	Cisco Nexus FRU (PowerSupply, Fan, Temp): Temperature is above warning threshold > 50°C Depends on: OKS-HK-DC01-SW01: Temperature is above warning threshold > 65°C	Problem: {OKS-HK-DC01-SW01:temperature.nexus.asic.last(#3)}>50 Recovery: {OKS-HK-DC01-SW01:temperature.nexus.asic.last(#5)}<50	Enabled	
☐	High	Cisco Nexus FRU (PowerSupply, Fan, Temp): Temperature is above warning threshold > 65°C Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	Problem: {OKS-HK-DC01-SW01:temperature.nexus.asic.last(#3)}>65 Recovery: {OKS-HK-DC01-SW01:temperature.nexus.asic.last(#5)}<65	Enabled	
☐	Average	Cisco Nexus FRU (PowerSupply, Fan, Temp): Teplota v Racku je vyšší jak > 35°C Depends on: OKS-HK-DC01-SW01: Teplota v Racku je vyšší jak > 40°C	Problem: {OKS-HK-DC01-SW01:temperature.nexus.intake.last(#3)}>35 Recovery: {OKS-HK-DC01-SW01:temperature.nexus.intake.last(#5)}<35	Enabled	
☐	High	Cisco Nexus FRU (PowerSupply, Fan, Temp): Teplota v Racku je vyšší jak > 40°C Depends on: OKS-HK-DC01-SW01: Unavailable by ICMP ping	Problem: {OKS-HK-DC01-SW01:temperature.nexus.intake.last(#3)}>40 Recovery: {OKS-HK-DC01-SW01:temperature.nexus.intake.last(#5)}<40	Enabled	
☐	High	Template Module ICMP Ping: Unavailable by ICMP ping	{OKS-HK-DC01-SW01:icmping.max(#3)}=0	Enabled	
☐	Warning	Template Module Generic SNMPv2_TEST: (HOST.NAME) has been restarted Depends on: OKS-HK-DC01-SW01: No SNMP data collection	{OKS-HK-DC01-SW01:system.uptime.last(1)}<10m	Enabled	

Obrázek 9: Výpis části triggerů na zařízení SW OKS-HK-DC01-SW01(druhá část)

Monitoring hosta OKS-HK-ESX01 (latest data) a vytvořené triggery

V této části jsou zobrazeny jednotlivé itemy a vytvořené triggery pro hosta hypervisor OKS-HK-ESX01. Obrázek 10 a Obrázek 11 zobrazují Latest data. Sloupec Last value zobrazuje poslední vyčtenou hodnotu z hosta. Jak je vidět z obrázků tak monitorované itemy jsou rozdílné oproti OKS-HK-DC01-SW01 výše. Monitorují se zde jednotlivé připojené disky, informace o zařízení, paměť RAM, jednotlivá CPU, dostupnost zařízení a jednotlivé virtuální stanice, které jsou pod tímto hypervisorem spuštěné. Obrázek 12 zobrazuje nastavené triggery a jejich závislosti na jiné triggeru. Z obrázků je také vidět v jakém případě se trigger spustí (je vidět syntaxe triggeru).

☐ Name ▲	Last check	Last value	Change
▼ Disk partitions (12 Items)			
☐ /vmfs/volumes/5a58bb60-68d413c4-dc7e-0025b500001c: Storage Free %	2018-05-14 09:07:35	27.22 %	Graph
☐ /vmfs/volumes/5a58bb60-68d413c4-dc7e-0025b500001c: Storage Free Space	2018-05-14 09:07:38	1.71 TBytes	Graph
☐ /vmfs/volumes/5a58bb60-68d413c4-dc7e-0025b500001c: Storage Size	2018-05-14 09:07:41	6.29 TBytes	Graph
☐ /vmfs/volumes/5a58bb60-68d413c4-dc7e-0025b500001c: Storage Used	2018-05-14 09:07:44	4.58 TBytes	Graph
☐ /vmfs/volumes/5880ccd1-df948c86-fab4-0025b5aa0000: Storage Free %	2018-05-14 09:07:33	5.94 %	Graph
☐ /vmfs/volumes/5880ccd1-df948c86-fab4-0025b5aa0000: Storage Free Space	2018-05-14 09:07:36	373.86 GBytes	Graph
☐ /vmfs/volumes/5880ccd1-df948c86-fab4-0025b5aa0000: Storage Size	2018-05-14 09:07:39	6.29 TBytes	Graph
☐ /vmfs/volumes/5880ccd1-df948c86-fab4-0025b5aa0000: Storage Used	2018-05-14 09:07:42	5.92 TBytes	-4 MBytes Graph
☐ /vmfs/volumes/5919b30d-79360269-55de-0025b500001c: Storage Free %	2018-05-14 09:07:34	97.89 %	Graph
☐ /vmfs/volumes/5919b30d-79360269-55de-0025b500001c: Storage Free Space	2018-05-14 09:07:37	2.05 TBytes	Graph
☐ /vmfs/volumes/5919b30d-79360269-55de-0025b500001c: Storage Size	2018-05-14 09:07:40	2.1 Tbytes	Graph
☐ /vmfs/volumes/5919b30d-79360269-55de-0025b500001c: Storage Used	2018-05-14 09:07:43	44.16 GBytes	Graph
▼ General (5 Items)			
☐ ESXi name	2018-05-14 08:50:56	oks-hk-oob-esx1.sec.ce...	History
☐ ESXi uptime	2018-05-14 08:55:57	40 days, 14:31:03	+00:05:00 Graph
☐ ESXi Version	2018-05-14 08:51:00	6.5.0	History
☐ ESXi VMWare Build	2018-05-14 08:50:59	7967591	Graph
☐ System ESXi Uptime	2018-05-14 08:55:55	40 days, 14:32:01	+00:04:59 Graph
► Interfaces (26 Items)			
▼ Memory (5 Items)			
☐ Memory Available	2018-05-14 08:55:30	274.59 GBytes	Graph
☐ Memory Free	2018-05-14 09:07:29	123.41 GBytes	-847.87 KBytes Graph
☐ Memory Free %	2018-05-14 09:07:28	44.94 %	Graph
☐ Memory Used	2018-05-14 09:07:32	151.18 GBytes	+81.92 KBytes Graph
☐ Memory Used %	2018-05-14 09:07:31	55.06 %	Graph
▼ Processors (49 Items)			
☐ AVG CPU Load	2018-05-14 09:07:58	4 %	Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/0/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GH	2018-05-14 09:07:34	2 %	+1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/1/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GH	2018-05-14 09:07:35	2 %	+1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/2/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GH	2018-05-14 09:07:36	1 %	-1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/3/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GH	2018-05-14 09:07:37	2 %	+1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/4/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GH	2018-05-14 09:07:38	1 %	-1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/5/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GH	2018-05-14 09:07:39	4 %	+2 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/6/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GH	2018-05-14 09:07:40	1 %	-1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/7/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GH	2018-05-14 09:07:41	1 %	-1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/8/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GH	2018-05-14 09:07:42	1 %	Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/9/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GH	2018-05-14 09:07:43	1 %	Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/10/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:07:44	2 %	+2 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/11/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:07:45	1 %	-1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/12/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:07:46	2 %	Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/13/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:07:47	2 %	+1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/14/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:07:48	2 %	+1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/15/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:07:49	2 %	-1 % Graph
☐ Used CPU% CPU Pkg/ID/Node: 0/16/0 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:07:50	1 %	-1 % Graph

Obrázek 10: Latest data pro zařízení ESXi OKS-HK-ESX01 (první část)

☐	Used CPU% CPU Pkg/ID/Node: 1/39/1 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:10:13	13 %	+8 %	Graph
☐	Used CPU% CPU Pkg/ID/Node: 1/40/1 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:10:14	3 %	-3 %	Graph
☐	Used CPU% CPU Pkg/ID/Node: 1/41/1 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:10:15	6 %	+3 %	Graph
☐	Used CPU% CPU Pkg/ID/Node: 1/42/1 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:10:16	3 %	+1 %	Graph
☐	Used CPU% CPU Pkg/ID/Node: 1/43/1 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:10:17	10 %	+6 %	Graph
☐	Used CPU% CPU Pkg/ID/Node: 1/44/1 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:10:18	10 %	+8 %	Graph
☐	Used CPU% CPU Pkg/ID/Node: 1/45/1 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:09:19	3 %	-7 %	Graph
☐	Used CPU% CPU Pkg/ID/Node: 1/46/1 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:10:20	10 %	+7 %	Graph
☐	Used CPU% CPU Pkg/ID/Node: 1/47/1 Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20G	2018-05-14 09:09:21	4 %	-6 %	Graph
▼	Status (3 Items)				
☐	ICMP loss	2018-05-14 09:10:18	33.33 %	+33.33 %	Graph
☐	ICMP ping	2018-05-14 09:10:18	Up (1)		Graph
☐	ICMP response time	2018-05-14 09:10:18	0.8ms		Graph
▼	Virtual Machines (72 Items)				
☐	VM: JSVP-HK-MGMNT01: Available Memory	2018-05-14 09:09:42	8 GB		Graph
☒	VM: JSVP-HK-MGMNT01: Guest State	2018-05-14 09:10:20	running		Hist...
☐	VM: JSVP-HK-MGMNT01: Number of CPU	2018-05-14 08:00:04	4 CPU		Graph
☒	VM: JSVP-HK-MGMNT01: Power State	2018-05-14 09:09:26	powered on		Hist...
☐	VM: JSVP-HK-MSSQL01: Available Memory	2018-05-14 09:09:39	16 GB		Graph
☒	VM: JSVP-HK-MSSQL01: Guest State	2018-05-14 09:10:17	running		Hist...
☐	VM: JSVP-HK-MSSQL01: Number of CPU	2018-05-14 08:00:01	8 CPU		Graph
☒	VM: JSVP-HK-MSSQL01: Power State	2018-05-14 09:09:23	powered on		Hist...
☐	VM: JSVP-HK-SE01: Available Memory	2018-05-14 09:09:30	8 GB		Graph
☒	VM: JSVP-HK-SE01: Guest State	2018-05-14 09:10:08	running		Hist...
☐	VM: JSVP-HK-SE01: Number of CPU	2018-05-14 08:59:52	2 CPU		Graph
☒	VM: JSVP-HK-SE01: Power State	2018-05-14 09:10:14	powered on		Hist...
☐	VM: OKS-HK-AH01: Available Memory	2018-05-14 09:09:34	8 GB		Graph
☒	VM: OKS-HK-AH01: Guest State	2018-05-14 09:10:12	running		Hist...
☐	VM: OKS-HK-AH01: Number of CPU	2018-05-14 08:59:56	2 CPU		Graph
☒	VM: OKS-HK-AH01: Power State	2018-05-14 09:10:18	powered on		Hist...
☐	VM: OKS-HK-CA-CEZd: Available Memory	2018-05-14 09:09:43	6 GB		Graph
☒	VM: OKS-HK-CA-CEZd: Guest State	2018-05-14 09:09:21	running		Hist...
☐	VM: OKS-HK-CA-CEZd: Number of CPU	2018-05-14 08:00:05	2 CPU		Graph
☒	VM: OKS-HK-CA-CEZd: Power State	2018-05-14 09:09:27	powered on		Hist...
☐	VM: OKS-HK-CDP1RCA-CEZD: Available Memory	2018-05-14 09:09:28	6 GB		Graph
☒	VM: OKS-HK-CDP1RCA-CEZD: Guest State	2018-05-14 09:10:06	running		Hist...
☐	VM: OKS-HK-CDP1RCA-CEZD: Number of CPU	2018-05-14 09:01:10	2 CPU		Graph
☒	VM: OKS-HK-CDP1RCA-CEZD: Power State	2018-05-14 09:10:12	powered on		Hist...

Obrázek 11: Latest data pro zařízení ESXi OKS-HK-ESX01 (druhá část)

☐	High	Memory Discovery: Available Memory is less than 10% Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwMemUsed[7].last(0)} / {OKS-HK-ESX1:vmwMemTotal[7].last(0)} > 0.9	Enabled
☐	Warning	Template Module ICMP Ping: High ICMP ping loss Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:icmppingloss.min(5m)}>{\$ICMP_LOSS_WARN} and {OKS-HK-ESX1:icmppingloss.min(5m)}<100	Enabled
☐	Warning	Template Module ICMP Ping: High ICMP ping response time Depends on: OKS-HK-ESX1: High ICMP ping loss OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:icmppingsec.avg(5m)}>{\$ICMP_RESPONSE_TIME_WARN}	Enabled
☐	High	Template Module ICMP Ping: Unavailable by ICMP ping	{OKS-HK-ESX1:icmpping.max(#3)}=0	Enabled
☐	Information	Virtual Machines Discovery: VM JSVP-HK-MGMNT01 is POWERED OFF Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[90].str(powered on,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[90].str(powered off)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM JSVP-HK-MGMNT01 is POWERED ON Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[90].str(powered off,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[90].str(powered on)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM JSVP-HK-MSSQL01 is POWERED OFF Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[86].str(powered on,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[86].str(powered off)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM JSVP-HK-MSSQL01 is POWERED ON Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[86].str(powered off,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[86].str(powered on)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM JSVP-HK-SE01 is POWERED OFF Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[74].str(powered on,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[74].str(powered off)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM JSVP-HK-SE01 is POWERED ON Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[74].str(powered off,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[74].str(powered on)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM OKS-HK-AH01 is POWERED OFF Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[81].str(powered on,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[81].str(powered off)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM OKS-HK-AH01 is POWERED ON Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[81].str(powered off,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[81].str(powered on)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM OKS-HK-CA-CEZd is POWERED OFF Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[91].str(powered on,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[91].str(powered off)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM OKS-HK-CA-CEZd is POWERED ON Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[91].str(powered off,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[91].str(powered on)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM OKS-HK-CDP1RCA-CEZD is POWERED OFF Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[72].str(powered on,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[72].str(powered off)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM OKS-HK-CDP1RCA-CEZD is POWERED ON Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[72].str(powered off,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[72].str(powered on)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM OKS-HK-DC02 is POWERED OFF Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[70].str(powered on,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[70].str(powered off)}=1	Enabled
☐	Information	Virtual Machines Discovery: VM OKS-HK-DC02 is POWERED ON Depends on: OKS-HK-ESX1: Unavailable by ICMP ping	{OKS-HK-ESX1:vmwVMPower[70].str(powered off,#60)}=1 and {OKS-HK-ESX1:vmwVMPower[70].str(powered on)}=1	Enabled

Obrázek 12: Výpis části triggerů pro zařízení ESXi OKS-HK-ESX01

Ukázka vytvořených grafů

V této části přílohy je zobrazen screen na hostu switch OKS-HK-WAN-SW01-MGMT. Je zde vidět část monitorovaných rozhraní, kde pro každé z nich je zde datová prostupnost pro downlink a uplink (input a output). Pokud je potřeba grafy zobrazovat samostatně, stačí pouze kliknout na daný graf.



Obrázek 13: Ukázka grafů vytvořených na SW OKS-HK-WAN-SW01-MGMT

Monitoring pomocí Zabbix agenta

V této části jsou zobrazeny jednotlivé ítemy a vytvořené trigger pro hosta (linux) OKS-HK-DOKUWIKI, který je monitorovaný pomocí Zabbix agenta. Template použitý pro tento monitoring byl již součástí instalace Zabbix serveru od jeho tvůrců. Obrázek 14 a Obrázek 15 zobrazují Latest data. Vzhledem k tomu, že se jedná o OS Linux Centos jsou zde monitorovány ítemy jako využití procesoru, místo na disku, uptime OS, počet spuštěných procesů a podobně. Obrázek 16 zobrazuje nastavené trigger a jejich závislosti na jiné trigger.

☐ Name ▲	Last check	Last value	Change	
▼ CPU (13 items)				
☐ Context switches per second	2018-04-09 12:05:44	65 sps	+2 sps	Graph
☐ CPU idle time	2018-04-09 12:05:45	99.9 %		Graph
☐ CPU interrupt time	2018-04-09 12:05:46	0 %		Graph
☐ CPU iowait time	2018-04-09 12:05:47	0 %		Graph
☐ CPU nice time	2018-04-09 12:05:48	0 %		Graph
☐ CPU softirq time	2018-04-09 12:05:49	0.0083 %		Graph
☐ CPU steal time	2018-04-09 12:05:50	0 %		Graph
☐ CPU system time	2018-04-09 12:05:51	0.06 %	-0.01 %	Graph
☐ CPU user time	2018-04-09 12:05:52	0.03 %		Graph
☐ Interrupts per second	2018-04-09 12:05:40	38 ips		Graph
☐ Processor load (1 min average per core)	2018-04-09 12:05:42	0		Graph
☐ Processor load (5 min average per core)	2018-04-09 12:05:43	0.005		Graph
☐ Processor load (15 min average per core)	2018-04-09 12:05:41	0.03		Graph
▼ Filesystems (10 items)				
☐ Free disk space on /	2018-04-09 12:05:08	16.21 GB	+324 KB	Graph
☐ Free disk space on / (percentage)	2018-04-09 12:05:10	92.62 %		Graph
☐ Free disk space on /boot	2018-04-09 12:05:09	398.82 MB		Graph
☐ Free disk space on /boot (percentage)	2018-04-09 12:05:11	80.3 %		Graph
☐ Free inodes on / (percentage)	2018-04-09 12:05:06	99.75 %		Graph
☐ Free inodes on /boot (percentage)	2018-04-09 12:05:07	99.94 %		Graph
☐ Total disk space on /	2018-04-09 11:53:12	17.5 GB		Graph
☐ Total disk space on /boot	2018-04-09 11:53:13	496.67 MB		Graph
☐ Used disk space on /	2018-04-09 12:05:14	1.29 GB	-324 KB	Graph
☐ Used disk space on /boot	2018-04-09 12:05:15	97.84 MB		Graph
▼ General (5 items)				
☐ Host boot time	2018-04-09 12:02:39	2018-04-06 16:12:25		Graph
☐ Host local time	2018-04-09 12:05:54	2018-04-09 14:05:50	+00:01:00	Graph
☒ Host name	2018-04-09 11:52:53	localhost.localdomain		History
☒ System information	2018-04-09 11:52:58	Linux localhost.localdomai...		History
☐ System uptime	2018-04-09 12:02:59	2 days, 21:50:31	+00:10:00	Graph
▼ Memory (5 items)				
☐ Available memory	2018-04-09 12:06:02	3.37 GB	+100 KB	Graph
☐ Free swap space	2018-04-09 12:05:55	2 GB		Graph
☐ Free swap space in %	2018-04-09 12:05:56	100 %		Graph
☐ Total memory	2018-04-09 11:53:03	3.7 GB		Graph
☐ Total swap space	2018-04-09 11:52:57	2 GB		Graph
▼ Network interfaces (2 items)				
☐ Incoming network traffic on eno16780032	2018-04-09 12:06:04	1.94 Kbps	+56 bps	Graph
☐ Outgoing network traffic on eno16780032	2018-04-09 12:05:05	1.62 Kbps	+72 bps	Graph
▼ OS (8 items)				
☐ Host boot time	2018-04-09 12:02:39	2018-04-06 16:12:25		Graph
☐ Host local time	2018-04-09 12:05:54	2018-04-09 14:05:50	+00:01:00	Graph
☒ Host name	2018-04-09 11:52:53	localhost.localdomain		History
☐ Maximum number of opened files	2018-04-09 11:52:35	384516		Graph
☐ Maximum number of processes	2018-04-09 11:52:36	32768		Graph
☐ Number of logged in users	2018-04-09 12:06:00	0		Graph

Obrázek 14: Latest data virtuální stanice Dokuwiki (první část)

☐ System information	2018-04-09 11:52:58	Linux localhost.localdomai...		History
☐ System uptime	2018-04-09 12:02:59	2 days, 21:50:31	+00:10:00	Graph
▼ Performance (13 Items)				
☐ Context switches per second	2018-04-09 12:06:44	64 sps	-1 sps	Graph
☐ CPU idle time	2018-04-09 12:06:45	99.91 %		Graph
☐ CPU interrupt time	2018-04-09 12:06:46	0 %		Graph
☐ CPU iowait time	2018-04-09 12:06:47	0.0083 %		Graph
☐ CPU nice time	2018-04-09 12:06:48	0 %		Graph
☐ CPU softirq time	2018-04-09 12:06:49	0 %		Graph
☐ CPU steal time	2018-04-09 12:06:50	0 %		Graph
☐ CPU system time	2018-04-09 12:06:51	0.06 %		Graph
☐ CPU user time	2018-04-09 12:06:52	0.03 %		Graph
☐ Interrupts per second	2018-04-09 12:06:40	38 ips		Graph
☐ Processor load (1 min average per core)	2018-04-09 12:06:42	0		Graph
☐ Processor load (5 min average per core)	2018-04-09 12:06:43	0.005		Graph
☐ Processor load (15 min average per core)	2018-04-09 12:06:41	0.03		Graph
▼ Processes (2 Items)				
☐ Number of processes	2018-04-09 12:06:38	173		Graph
☐ Number of running processes	2018-04-09 12:06:37	2	+1	Graph
▼ Security (2 Items)				
☐ Checksum of /etc/passwd	2018-04-09 11:53:01	3641870581		Graph
☐ Number of logged in users	2018-04-09 12:07:00	0		Graph
▼ Status (3 Items)				
☐ ICMP loss	2018-04-09 12:06:29	0 %		Graph
☐ ICMP ping	2018-04-09 12:06:59	Up (1)		Graph
☐ ICMP response time	2018-04-09 12:06:29	1.1ms		Graph
▼ Zabbix agent (3 Items)				
☐ Agent ping	2018-04-09 12:06:33	Up (1)		Graph
☐ Host name of zabbix_agentd running	2018-04-09 11:52:32	OKS-HK-DOKUWIKI		History
☐ Version of zabbix_agentd() running	2018-04-09 11:52:34	3.4.2		History

Obrázek 15: Latest data virtuální stanice Dokuwiki (druhá část)

☐ Severity	Name ▲	Expression	Status	Info
☐ Warning	Template OS Linux: /etc/passwd has been changed on {HOST.NAME}	{OKS-HK-DOKUWIKI:vf.fs.cksum[/etc/passwd].diff(0)}>0	Enabled	
☐ Information	Template OS Linux: Configured max number of opened files is too low on {HOST.NAME}	{OKS-HK-DOKUWIKI:kernel.maxfiles.last(0)}<1024	Enabled	
☐ Information	Template OS Linux: Configured max number of processes is too low on {HOST.NAME}	{OKS-HK-DOKUWIKI:kernel.maxproc.last(0)}<256	Enabled	
☐ Warning	Template OS Linux: Disk I/O is overloaded on {HOST.NAME}	{OKS-HK-DOKUWIKI:system.cpu.util[,iowait].avg(5m)}>20	Enabled	
☐ Warning	Mounted filesystem discovery: Free disk space is less than 20% on volume /	{OKS-HK-DOKUWIKI:vf.fs.size[/,pfree].last(0)}<20	Enabled	
☐ Warning	Mounted filesystem discovery: Free disk space is less than 20% on volume /boot	{OKS-HK-DOKUWIKI:vf.fs.size[/boot,pfree].last(0)}<20	Enabled	
☐ Warning	Mounted filesystem discovery: Free inodes is less than 20% on volume /	{OKS-HK-DOKUWIKI:vf.fs.inode[/,pfree].last(0)}<20	Enabled	
☐ Warning	Mounted filesystem discovery: Free inodes is less than 20% on volume /boot	{OKS-HK-DOKUWIKI:vf.fs.inode[/boot,pfree].last(0)}<20	Enabled	
☐ Warning	Template Module ICMP Ping: High ICMP ping loss Depends on: OKS-HK-DOKUWIKI: Unavailable by ICMP ping	{OKS-HK-DOKUWIKI:icmppingloss.min(5m)}>{SICMP_LOSS_WARN} and {OKS-HK-DOKUWIKI:icmppingloss.min(5m)}<100	Enabled	
☐ Warning	Template Module ICMP Ping: High ICMP ping response time Depends on: OKS-HK-DOKUWIKI: High ICMP ping loss OKS-HK-DOKUWIKI: Unavailable by ICMP ping	{OKS-HK-DOKUWIKI:icmppingsec.avg(5m)}>{SICMP_RESPONSE_TIME_WARN}	Enabled	
☐ Information	Template OS Linux: Host information was changed on {HOST.NAME}	{OKS-HK-DOKUWIKI:system.uname.diff(0)}>0	Enabled	
☐ Information	Template App Zabbix Agent: Host name of zabbix_agentd was changed on {HOST.NAME}	{OKS-HK-DOKUWIKI:agent.hostname.diff(0)}>0	Enabled	
☐ Information	Template OS Linux: Hostname was changed on {HOST.NAME}	{OKS-HK-DOKUWIKI:system.hostname.diff(0)}>0	Enabled	
☐ Average	Template OS Linux: Lack of available memory on server {HOST.NAME}	{OKS-HK-DOKUWIKI:vm.memory.size[available].last(0)}<20M	Enabled	
☐ Warning	Template OS Linux: Lack of free swap space on {HOST.NAME}	{OKS-HK-DOKUWIKI:system.swap.size[,pfree].last(0)}<50	Enabled	
☐ Warning	Template OS Linux: Processor load is too high on {HOST.NAME}	{OKS-HK-DOKUWIKI:system.cpu.load[percpu,avg1].avg(5m)}>5	Enabled	
☐ Warning	Template OS Linux: Too many processes on {HOST.NAME}	{OKS-HK-DOKUWIKI:proc.num[,].avg(5m)}>300	Enabled	
☐ Warning	Template OS Linux: Too many processes running on {HOST.NAME}	{OKS-HK-DOKUWIKI:proc.num[,run].avg(5m)}>30	Enabled	
☐ High	Template Module ICMP Ping: Unavailable by ICMP ping	{OKS-HK-DOKUWIKI:icmpping.max(#3)}=0	Enabled	
☐ Information	Template App Zabbix Agent: Version of zabbix_agentd() was changed on {HOST.NAME}	{OKS-HK-DOKUWIKI:agent.version.diff(0)}>0	Enabled	
☐ Average	Template App Zabbix Agent: Zabbix agent on {HOST.NAME} is unreachable for 5 minutes	{OKS-HK-DOKUWIKI:agent.ping.nodata(5m)}=1	Enabled	
☐ Information	Template OS Linux: {HOST.NAME} has just been restarted	{OKS-HK-DOKUWIKI:system.uptime.change(0)}<0	Enabled	

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Obrázek 16: Triggery virtuální stanice Dokuwiki