



SNMP, for those times you can't install the Zabbix agent.

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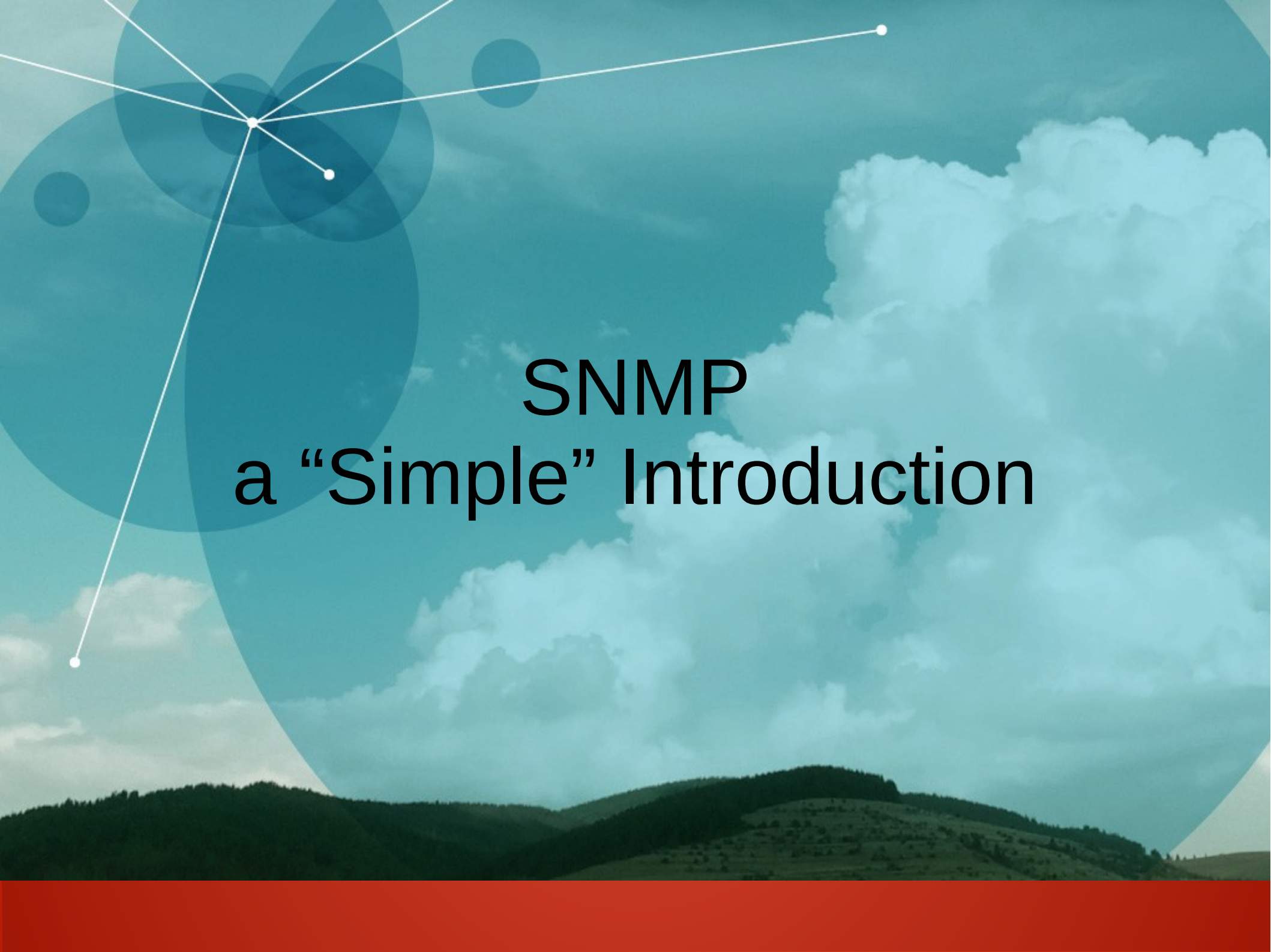
Overview

- Introduction
- What is SNMP
- Extending the Net-SNMP agent
- My first MIB
- A sub-agent for your MIB

\$ whoami

- Andrew Nelson
- anelson@redhat.com
- Senior Linux Consultant with Red Hat North America
- Active in the Zabbix community for approximately 10 years
- Known as “nelsonab” in forums and IRC
- Author of the Zabbix API Ruby library zbxapi





SNMP

a “Simple” Introduction

Topics

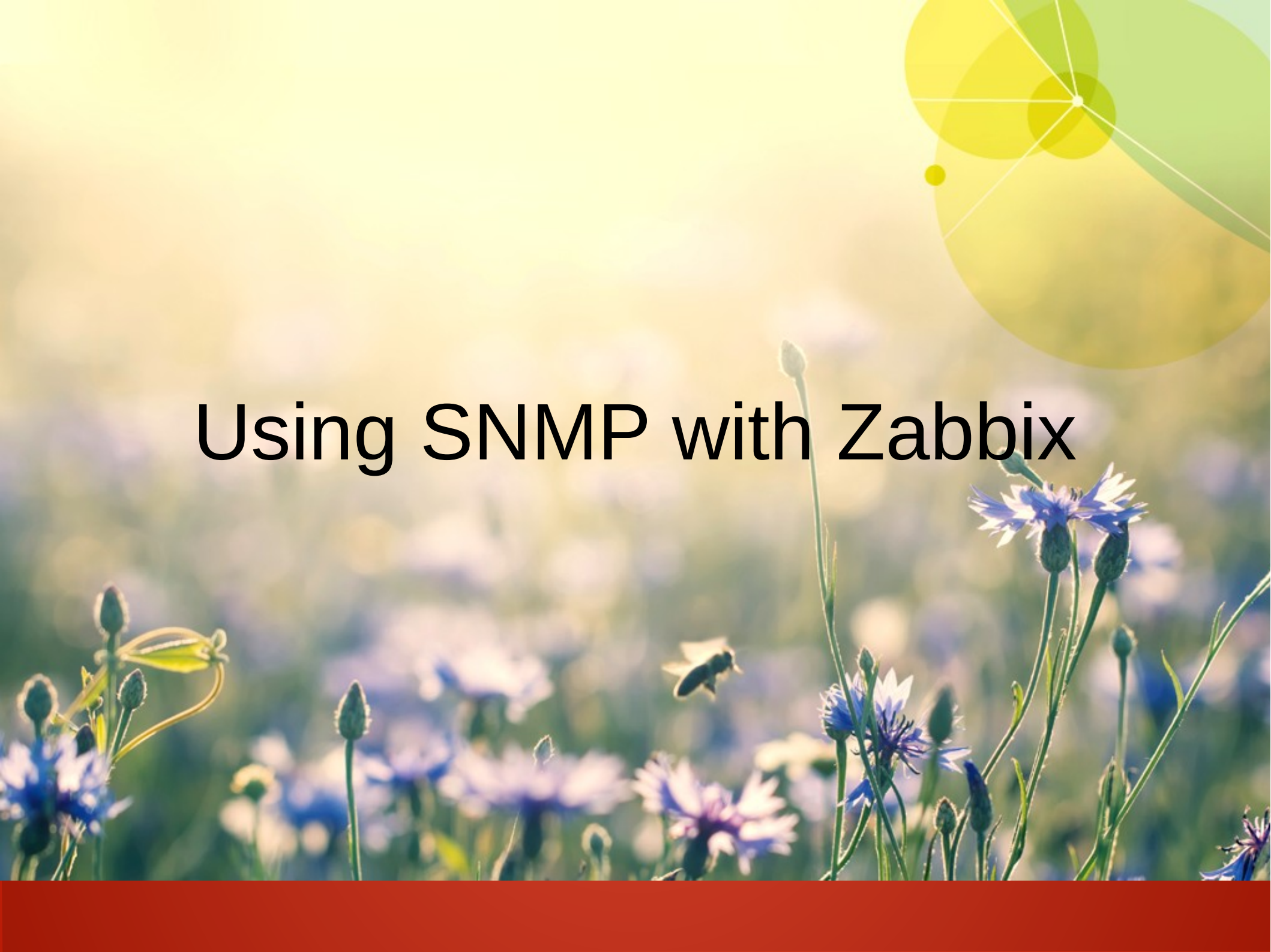
- SNMP Overview
 - OIDs
 - Units
 - Tables
- Using SNMP With Zabbix
- Extending SNMP

What is SNMP

- Simple Network Monitoring Protocol
 - Like all standards, it's not simple!
 - Defined by numerous RFCs
 - Uses a hierarchical data model
 - Employs an Agent – Manager design
 - Agents can be nested
 - Is extensible

What is SNMP

- SNMP uses OIDs to identify each item
- OIDs are numeric with text translations provided by MIB files.



Using SNMP with Zabbix

Zabbix And SNMP

- Available since version 1.1
- One request per network connection before 2.2.3
- Dynamic index lookups available since version 1.5
 - `Item["index","base item","row"]`
 - `ifInOctets["index","ifDescr","GigabitEthernet0/1"]`

Zabbix and SNMP

- Configure a global macro for {\$SNMP_COMMUNITY} then override locally for each host as needed.
 - Templates make use of this macro
- Some parameters require some “massaging” before they are useful.
- Disk space is often in the form of N Allocation Units, not bytes.
 - Calculated value: `allocation_units[disk]*free_space[disk]`

Zabbix and SNMP

- Because calculated items are needed timelines may become very skewed.
 - Free disk space is checked every 10 minutes
 - Space calculation is performed every 10 minutes
 - Graphed value could be time skewed by 20 minutes!
- Zabbix needs the ability for inbound value calculation.
 - If only there were a scripting interface for this.....

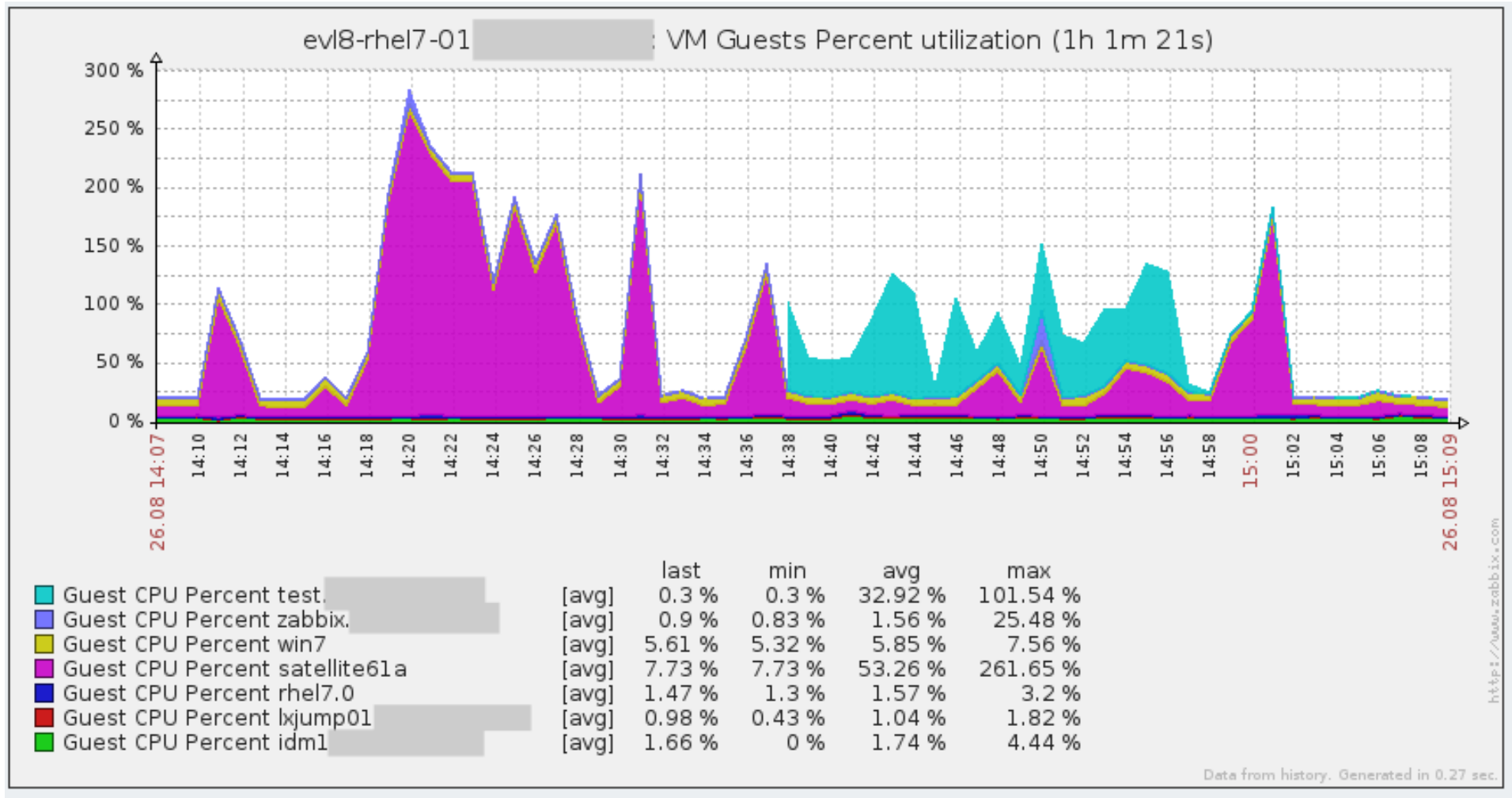
Zabbix and SNMP

- It is possible to derive percent utilization from accumulated time items.
- Set the item to Delta per second
- Convert the time scale to “centi-seconds” and store as a float with a unit of “%”.
- Resultant value will be an approximation of the percent utilization.
 - However, it is skewed by the number of threads (CPU's) available to process the item being counted.

Zabbix and SNMP

Name	Guest CPU Percent \$1								
Type	SNMPv2 agent								
Key	libvirtGuestCpuPercent[{#SNMPVALUE}]	Select							
SNMP OID	LIBVIRT-MIB::libvirtGuestCpuTime.{#SNMPINDEX}								
SNMP community	{#SNMP_COMMUNITY}								
Port									
Type of information	Numeric (float)								
Units	%								
Use custom multiplier	☒	0.0000001							
Update interval (in sec)	60								
Flexible intervals	<table><thead><tr><th>Interval</th><th>Period</th><th>Action</th></tr></thead><tbody><tr><td colspan="3">No flexible intervals defined.</td></tr></tbody></table>			Interval	Period	Action	No flexible intervals defined.		
Interval	Period	Action							
No flexible intervals defined.									
New flexible interval	Interval (in sec)	50	<table><tr><td>Period</td><td> 1-7,00:00-24:00 </td><td> Add </td></tr></table>	Period	1-7,00:00-24:00	Add			
Period	1-7,00:00-24:00	Add							
History storage period (in days)	1								
Trend storage period (in days)	7								
Store value	Delta (speed per second)								
Show value	As is show value mappings								

Zabbix and SNMP



Zabbix and SNMP

- When using SNMP for host discovery be careful when using SNMPv2-MIB::sysDescr.0
 - It will change with kernel updates
 - Zabbix will then detect the updated machine as a new system
 - Best to override this parameter in snmpd.conf, or perhaps use an extend script to return the dmi item uuid

```
# dmidecode -s system-uuid  
93737AE6-8A60-2B41-BEA4-B61C7ACD8063
```

Zabbix and SNMP

- When using direct OID numbers be careful.
 - OID number may remap over time, especially if the value in question is part of a table.
 - OID table members are not guaranteed to have the same OID numbers across restarts of the SNMP agent (or host reboot)
- If MIB text is not translating correctly ensure the MIB file is in /usr/share/snmp/mibs (for RHEL systems).
- Ensure the OID in question translates correctly using snmptranslate.

Zabbix and SNMP

- The snmp tools are your friends
 - net-snmp-utils rpm on RHEL
 - snmpwalk will allow you to peak at all of the items available.
 - Adding the parameter -On is useful when MIB translations or namespaces are hampering things.
 - snmptranslate can help ensure MIB files are loading correctly

```
$ snmptranslate -IR myCustomOID  
Unknown object identifier: myCustomOID
```



Going beyond the basic SNMP Agent

Extending Net-SNMP

- Common mechanisms available
 - Extend – Raw Shell Scripts
 - Perl – Call perl scripts directly
 - Pass – Start a subprocess to handle a given OID subtree
 - PassPersist – Similar to pass but keep running
 - AgentX – A form of sub-agent where a process listens for requests on a socket.
 - Plus a few more not mentioned above

Extending Net-SNMP

- A simple extend: (/usr/local/bin/check_proc.sh)

```
#!/bin/sh
```

```
PATTERN=$1
```

```
NUMPIDS=`pgrep $PATTERN | wc -l`
```

```
echo "There are $NUMPIDS $PATTERN processes."
```

```
echo "$NUMPIDS"
```

```
exit $NUMPIDS
```

- The statement in the snmpd.conf file

```
extend httpd_pids /bin/sh /usr/local/bin/check_proc.sh httpd
```

Extending Net SNMP

- Snmpwalk of the extend script

```
[root@zabbix-server snmp]# snmpwalk -v2c -c readonly localhost NET-SNMP-EXTEND-MIB::nsExtendObjects
NET-SNMP-EXTEND-MIB::nsExtendNumEntries.0 = INTEGER: 1
NET-SNMP-EXTEND-MIB::nsExtendCommand."http_pids" = STRING: /bin/bash
NET-SNMP-EXTEND-MIB::nsExtendArgs."http_pids" = STRING: /usr/local/bin/check_proc.sh httpd
NET-SNMP-EXTEND-MIB::nsExtendInput."http_pids" = STRING:
NET-SNMP-EXTEND-MIB::nsExtendCacheTime."http_pids" = INTEGER: 5
NET-SNMP-EXTEND-MIB::nsExtendExecType."http_pids" = INTEGER: exec(1)
NET-SNMP-EXTEND-MIB::nsExtendRunType."http_pids" = INTEGER: run-on-read(1)
NET-SNMP-EXTEND-MIB::nsExtendStorage."http_pids" = INTEGER: permanent(4)
NET-SNMP-EXTEND-MIB::nsExtendStatus."http_pids" = INTEGER: active(1)
NET-SNMP-EXTEND-MIB::nsExtendOutput1Line."http_pids" = STRING: There are 11 httpd processes.
NET-SNMP-EXTEND-MIB::nsExtendOutputFull."http_pids" = STRING: There are 11 httpd processes.
11
NET-SNMP-EXTEND-MIB::nsExtendOutNumLines."http_pids" = INTEGER: 2
NET-SNMP-EXTEND-MIB::nsExtendResult."http_pids" = INTEGER: 11
NET-SNMP-EXTEND-MIB::nsExtendOutLine."http_pids".1 = STRING: There are 11 httpd processes.
NET-SNMP-EXTEND-MIB::nsExtendOutLine."http_pids".2 = STRING: 11
```

Extending Net SNMP

- Adding the item is as simple as adding an snmp item and assigning it to a key
- No need to worry about OID's changing

Name	Number of \$1 pids		
Type	SNMPv2 agent ▼		
Key	pids [httpd]		Select
Host interface	▼		
SNMP OID	NET-SNMP-EXTEND-MIB::nsExtendResult"http_pids"		
SNMP community	{\${SNMP_COMMUNITY}}		
Port			
Type of information	Numeric (unsigned) ▼		
Data type	Decimal ▼		

Extending Net SNMP

- Note when using the exit value from a script, it's maximum value is 256, any value over will roll over.
 - Ex: An exit value of 5000 will result in an actual value of 136 $5000 - (256 * 19) = 136$
- Place the value in question on a separate line and use `NET-SNMP-EXTEND-MIB::nsExtendOutLine."ITEM".n`
 - Where n is the line in question and ITEM is the extend item.

Extending Net SNMP

- Adding uuid information to snmp via extend
extend host_uuid /usr/sbin/dmidecode -s system-uuid
- In discovery use the item:
NET-SNMP-EXTEND-MIB::nsExtendOutLine."host_uuid".1

The background of the slide features a bright blue sky with a sunburst effect in the upper left. Several white daisies with yellow centers are scattered across the frame. In the upper right, there are three overlapping circles in yellow, green, and teal, with a thin white line extending from the top right towards the center of the circles. The word "Conclusion" is centered in a large, black, sans-serif font.

Conclusion

Conclusion

Questions

Fragen jautājumi vragen

питання вопросы

pytania 質問 otázky

preguntas

spørsmål demande

kysymykset