Monitoring Microsoft Azure – a practitioner’s example

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About me

- Andreas Döhler
  - Linux since 1998 (from time to time)
  - Using Checkmk since 2009
  - Spare time mostly sport & electronics & forum answer guy :)

- Bechtle
  - 75 locations in D-A-CH region
  - IT-Systemhaus & IT-E-Commerce
  - 11,500 Employees
  - Home Location Chemnitz-Dresden-Cottbus
Situation: Customer decided to migrate entire on-premises datacenter to Microsoft Azure

- Customer is a medium-sized company with 60-70 VMs
- Needs to be able monitor his IT in the cloud as well
- No cloud expert myself, but had to do it
- Share my lessons learned today

*If you are an IT service provider, you might face the same challenge next.*
Agenda

1. Checkmk server deployment in the cloud
2. Monitoring cloud services
3. What’s next: End-to-End monitoring
Deploying Checkmk the easy or challenging way

Option 1
Use the virtual appliance

Option 2
Install standard package on a VM
The virtual appliance comes with many benefits

- Built-in HA possible
- No need for managing the operating system
- Easy deployment

Ideal for deployment of Checkmk in virtual environments ... like a cloud
But I ran into problems...

- Azure VM without any IP configuration only provide **serial console access**
- This is a “real” serial console
- Test with preconfigured appliance image from local Hyper-V - disk init step could be solved with this

Had to decide as every upload of a preconfigured VM takes time.

This was the challenging option
Welcome to the Pulse Secure IVE Serial Console!
Current version: 5
Reset version: 5

Please choose from among the following options:
1. Network Settings and Tools
2. Create admin username and password
3. Display log
4. System Operations
5. Toggle password protection for the console
6. Create a Super Admin session.
7. System Snaphot
Choice:
The solution: Just deploy Checkmk on a VM

- Creating a VM is easy
- Fully automated deployment of Linux inside Azure
- Installing Checkmk on VM is very easy
- Decision needed how big the VM should be → monthly cost
Sizing the VM

- In the cloud, rather ~20 services per host instead of 30-40 services

- How many cores are needed?
  - 4 cores - 2 would be enough if no graphic environment is present for some web tests

- How much memory?
  - 8 GB would be enough but you need to go with the templates from Azure, in our case the 4 core machine had 32 GB

- How much HDD?
  - A small 32 GB is here enough if you don’t plan to monitor many hosts (no network devices in our setup)
What about my network infrastructure?

- You might be able to migrate your servers into the cloud.
- Your switches and office network do not migrate to the cloud though.
- Instead of monitoring them from the cloud, create an extra Checkmk site locally.
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What happened to all my servers?

Database Servers

Load Balancers

Application Servers

Database Services

Load Balancing Service

VM with Application
What does that mean for my monitoring?

- Monitor with Azure Special Agent
  - Define the resource groups you want to see. Start with one or two for testing.
  - Compare the results from the Special Agent with your Azure dashboard
  - Not all resource types existing in Azure are supported by the Special Agent at the moment
- You already get most of the data you need
- Complement with Linux or Windows agent for virtual machines in the cloud
### Monitoring databases in Azure

- **Use Azure Special Agent + Azure SQL Databases Checks**
- **Problems**
  - Not all data sent from API, from time to time

<table>
<thead>
<tr>
<th>DB Name</th>
<th>Status</th>
<th>Description</th>
<th>Location</th>
<th>Environment</th>
<th>Prod.</th>
<th>System</th>
<th>Workload</th>
<th>Date/Time</th>
<th>CPU%</th>
<th>DTU</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB TEST-1</td>
<td>OK</td>
<td>OK - Location: westeurope, Environment: prod, System: ..., Workload: applications</td>
<td>westeurope</td>
<td>prod</td>
<td>...</td>
<td>applications</td>
<td>2019-11-26 10:14:20</td>
<td>121 s</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>DB TEST-2 - Connections</td>
<td>OK</td>
<td>OK - Successful connections: 0, Rate of failed connections: 0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2020-01-30 23:23:17</td>
<td>121 s</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>DB TEST-3 - CPU</td>
<td>OK</td>
<td>OK - Total CPU: 0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2020-03-21 23:24:47</td>
<td>121 s</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>DB TEST-4 - Deadlocks</td>
<td>OK</td>
<td>OK - Deadlocks: 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2020-01-30 23:23:17</td>
<td>121 s</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>DB TEST-5 - DTU</td>
<td>OK</td>
<td>OK - Database throughput units: 0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>191 m</td>
<td>121 s</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>DB TEST-6 - Storage</td>
<td>OK</td>
<td>OK - Storage: 0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>191 m</td>
<td>121 s</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
Monitoring storage accounts in Azure

- Use Azure Special Agent + Azure Storage Accounts Check
- Strange values from latency
  - As long as both values are in the same range it is ok
  - Example are 5700ms and 7019ms
Monitoring networking & web services in Azure

- Use Azure Special Agent + Azure Virtual Network Gateway Check
- In my environment only Sites are monitored and used
- Agent can also give info on:
  - Point-to-site connections
  - Point-to-site bandwidth
  - Site-to-site bandwidth
Monitoring application servers in Azure

- Nothing has changed - just use the Checkmk Agent on the VM + configure the firewall
- In my environment mostly Windows VMs
Monitoring virtual machines

- There is also a check for an overview of VMs
- Basically like the VMware vSphere check
- A little bit more basic compared to VMware
- Data is per resource group
Other challenges when monitoring in the cloud

- Behavior of your queried API
  - Sometimes you get only partial data but also no error message
  - Staleness is very helpful for such situations if you don’t want many messages “Item not found in agent output”
  - With Mortiz Kiemer from t29: Build a solution that checks go stale if data is missing

- Very complex infrastructure if you don’t know Azure from the ground up

- Services not covered at the moment
  - Azure Vaults, Action Books, Automation Accounts and Connections as example

- API Limits are no problem with 40 resource groups at the moment
No check plug-in for my cloud service available...

- What about writing it yourself?
  - The Azure API is not “simple”
  - You can always ask tribe29, I heard they have new developers
  - The special agent gives you the found resources also if there is no check available

- Be creative
  - HTTP checks for load balancers
  - Own checks for BizTalk queues and their status
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The black box problem

- General problem in the cloud: a lot of abstraction
- You don’t see the inner working of a “service”, but get a “black box”
- Can be solved with end-to-end testing
- Fortunately, most applications in the cloud are web applications!
Next steps: Implement E2E monitoring

- There are many tools, e.g. Sakuli - however ...

- Current plan:
  - Headless container with Chrome
  - Control via Python API
  - Results as Checkmk plug-in or local check and integrate into my monitoring

- Anyone with experiences or tips? Reach out to me
Thank you