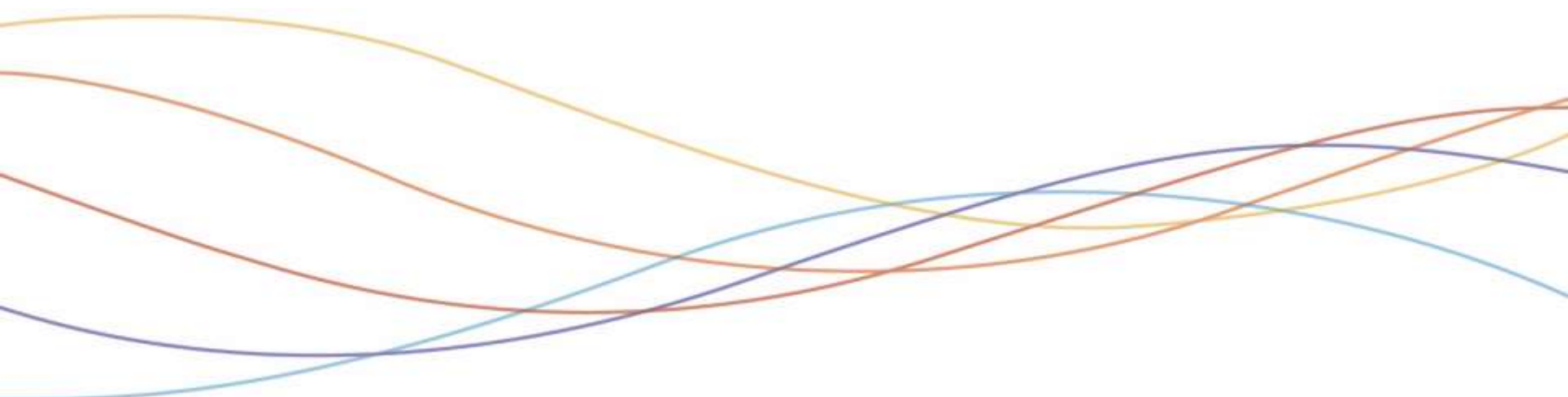


The logo features the word "kinetic" in a black, lowercase, cursive font, followed by "IT" in a bold, white, uppercase, sans-serif font inside a red circle. The entire logo is set against a background of several thin, wavy lines in shades of yellow, orange, and blue that sweep across the frame.

kinetic **IT**



Monitoring 7000+ hosts in Zabbix

Automate all the things



Today we're talking about...

- Zabbix Deployment
- Automation

About me


- Kinetic IT are a Managed Service Provider in Australia
<https://www.kineticit.com.au/>
- I work as a Senior Engineer in the Tools and Automation team at WA Department of Education

- Blog: <http://cavaliercoder.com/>
- GitHub: <https://github.com/cavaliercoder/>
- Twitter: <https://twitter.com/cavaliercoder>
- LinkedIn: <https://www.linkedin.com/in/ryanarmstrongwa>

WA Department of Education

Managing over **120,000 devices**
for approx. **400,000 people**
in **800 schools**

With **1500 heterogeneous servers**
Hub-spoke topology
Across **2.7 million km²**



**FACT:
Germany
can fit into
WA 7 times!**

Production stats

7000+
Hosts

1.5M
Items

450K
Triggers

2K
NVPS

Status of Zabbix		
Parameter	Value	Details
Zabbix server is running	Yes	
Number of hosts (enabled/disabled/templates)	7294	7010 / 24 / 260
Number of items (enabled/disabled/not supported)	2799239	1500094 / 1288355 / 10790
Number of triggers (enabled/disabled [problem/ok])	803114	479210 / 323904 [1020 / 478190]
Number of users (online)	288	14
Required server performance, new values per second	2297.08	-

Updated: 13:47:40

Zabbix topology

- Physical Zabbix server Dell R720 64GB memory
- Physical PostgreSQL server Dell R720 256GB memory
 - Local SSD in RAID 10
 - SAN attached storage for Tier 2 and archival data
 - PostgreSQL partitioning
- Virtual Web server for users
- 2nd Virtual Web server with high memory and long session optimisations for batch processing

Why automate?

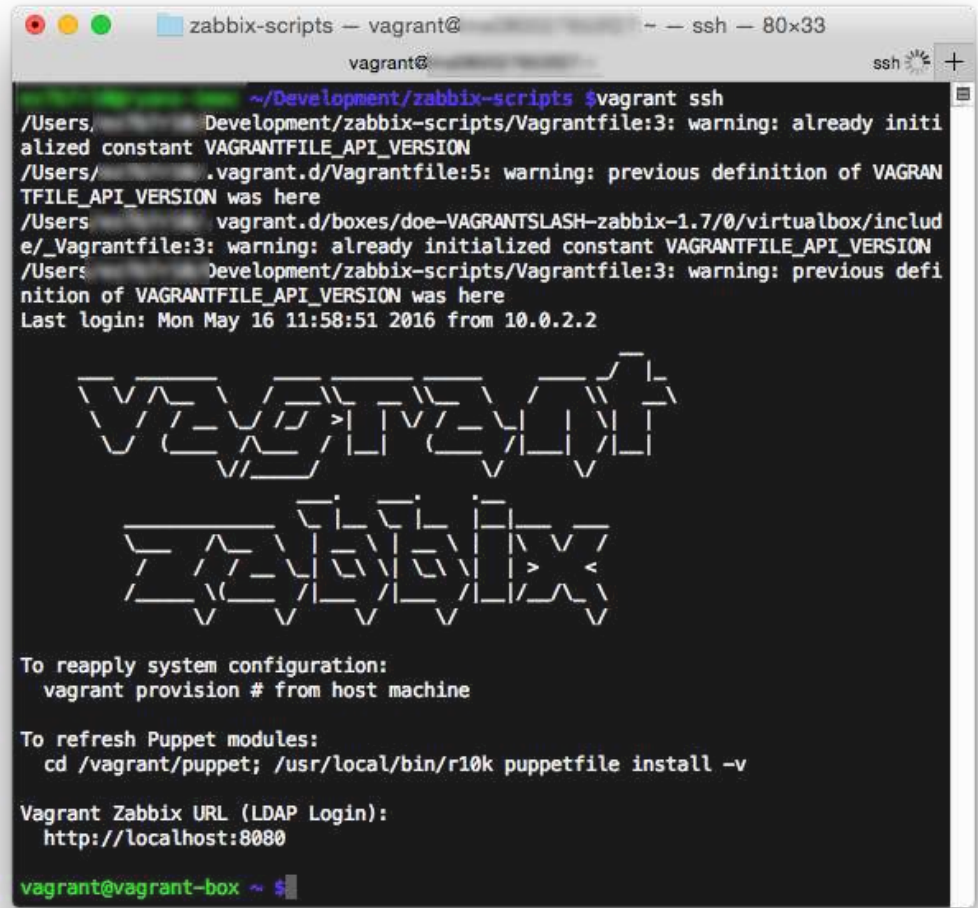
So we can spend time adding value!

Why automate?

- We want to spend our time:
 - Improving monitoring quality and coverage
 - Improving Event Management
 - Improving BI and capacity planning
 - Enhancing the user experience
- Not:
 - Adding/removing users and hosts
 - Keeping dev/test/prod in sync

Build Pipeline

- Provision Dev in Vagrant
- Build and configure with Puppet Enterprise
- Store all code in GitLab
- Package custom binaries with RPM and WiX



```
zabbix-scripts -- vagrant@ -- ssh -- 80x33
vagrant@
~/Development/zabbix-scripts $vagrant ssh
/Users/Development/zabbix-scripts/Vagrantfile:3: warning: already initialized constant VAGRANTFILE_API_VERSION
/Users/.vagrant.d/Vagrantfile:5: warning: previous definition of VAGRANTFILE_API_VERSION was here
/Users.vagrant.d/boxes/doi-VAGRANTSLASH-zabbix-1.7/0/virtualbox/include/Vagrantfile:3: warning: already initialized constant VAGRANTFILE_API_VERSION
/UsersDevelopment/zabbix-scripts/Vagrantfile:3: warning: previous definition of VAGRANTFILE_API_VERSION was here
Last login: Mon May 16 11:58:51 2016 from 10.0.2.2

VAGRANT
ZABBIX

To reapply system configuration:
vagrant provision # from host machine

To refresh Puppet modules:
cd /vagrant/puppet; /usr/local/bin/r10k puppetfile install -v

Vagrant Zabbix URL (LDAP Login):
http://localhost:8080

vagrant@vagrant-box ~ $
```

```
class_ems::profile::zabbix::server {
  1 class_ems::profile::zabbix::server {
  2   require ::ems::profile::zabbix::globals
  3
  4   # Install Zabbix server
  5   class { '::kzbx::server' :
  6     enable_pooling => false,
  7     manage_config => false, # we'll specify config next
  8   }
  9
 10  # modify server config file
 11  class { '::zabbix::server::config' :
 12    # redirect alert/external scripts to the custom scripts repo
 13    # this needs to be set here because alert_scripts_path and
 14    # external_scripts_path are not inherited from zabbix::globals.
 15    # database connection details are already inherited.
 16    alert_scripts_path => $::kzbx::params::alert_scripts_path,
 17    external_scripts_path => $::kzbx::params::external_scripts_path,
 18
 19    cache_size => '2G',
 20    history_cache_size => '1G',
 21    history_text_cache_size => '1G',
 22    log_file_size => 100,
 23    log_slow_queries => 1000,
 24    start_db_syncers => 4,
 25    start_discoverers => 10,
 26    start_http_pollers => 5,
 27    start_ipmi_pollers => 5,
 28    start_pingers => 75,
 29    start_pollers => 400,
 30    start_pollers_unreachable => 150,
 31    start_proxy_pollers => 1,
 32    start_snmp_trapper => 1,
 33    start_timers => 50,
 34    start_trappers => 50,
 35    start_vmware_collectors => 5,
 36    timeout => 30,
 37    tmp_dir => '/dev/shm',
 38    trend_cache_size => '1G',
 39    unavailable_delay => 60,
 40    unreachable_period => 300,
  }
```

Build Pipeline

- Puppet keeps Vagrant, dev, test and production identical
- Rebuild on a whim (Cattle, not pets)

Build Pipeline

- Nightly builds
 - Team City
 - Vagrant
 - Cucumber

```
@server
Feature: Zabbix server deployment

Scenario Outline: Environment variables are configured correctly # Features/zabbix_server.feature:5
  Given I am running as 'root' # features/zabbix_server.feature:6
  When I query environment variable '<envVar>' # features/zabbix_server.feature:7
  Then the value appears to be a valid <envFormat> # features/zabbix_server.feature:8

Examples:
  | envVar      | envFormat |
  | ZBX_ENV     | string    |
  | ZBX_USER    | string    |
  | ZBX_GROUP   | string    |
  | ZBX_HOME    | path      |
  | ZBX_REPO    | path      |
  | ZBX_URL     | url       |
  | Environment variable is set is not a valid URL (https://localhost) (@RuntimeError)
  | /features/step_definitions/step_zabbix_server.rb:27:in 'Then the value appears to be a valid (w+|b|/
  | features/zabbix_server.feature:7:in 'Then the value appears to be a valid url'
  | features/zabbix_server.feature:8:in 'Then the value appears to be a valid <envFormat>'

  | ZBX_DB_HOST | string    |
  | ZBX_DB_USER | string    |
  | ZBX_DB_SCHEMA | string    |
  | ZBX_DB_DATABASE | string    |

Scenario: Zabbix database is reachable # features/zabbix_server.feature:23
  Given Zabbix server is installed # features/step_definitions/step_zabbix_server.rb:38
  Zabbix server v2.4.4 (revision 52341) (23 February 2015)
  Compilation time: Aug 24 2015 14:28:05
  When I attempt to connect to the Zabbix database using the server settings # features/step_definitions/step_zabbix_server.rb:50
  Then the connection succeeds and the database version is available # features/step_definitions/step_zabbix_server.rb:54
  PostgreSQL 9.2.13 on x86_64-redhat-linux-gnu, compiled by gcc (GCC) 4.8.3 20140911 (Red Hat 4.8.3-9), 64-bit
  Zabbix database version: 2040000

@server
Feature: Zabbix server custom scripts

Scenario Outline: Script repositories are configured # features/zabbix_server_scripts.feature:5
  Given I am running as 'root' # features/zabbix_server_scripts.feature:6
  And '<repoName>' is deployed to '<repoPath>' # features/zabbix_server_scripts.feature:7
  When I check the configuration of the repo '<repoName>' # features/zabbix_server_scripts.feature:8
  Then the 'origin' remote is set to '<repoOrigin>' # features/zabbix_server_scripts.feature:9
  And the checked out branch is '<repoBranch>' # features/zabbix_server_scripts.feature:10

Examples:
  | repoName | repoPath | repoOrigin | repoBranch |
```

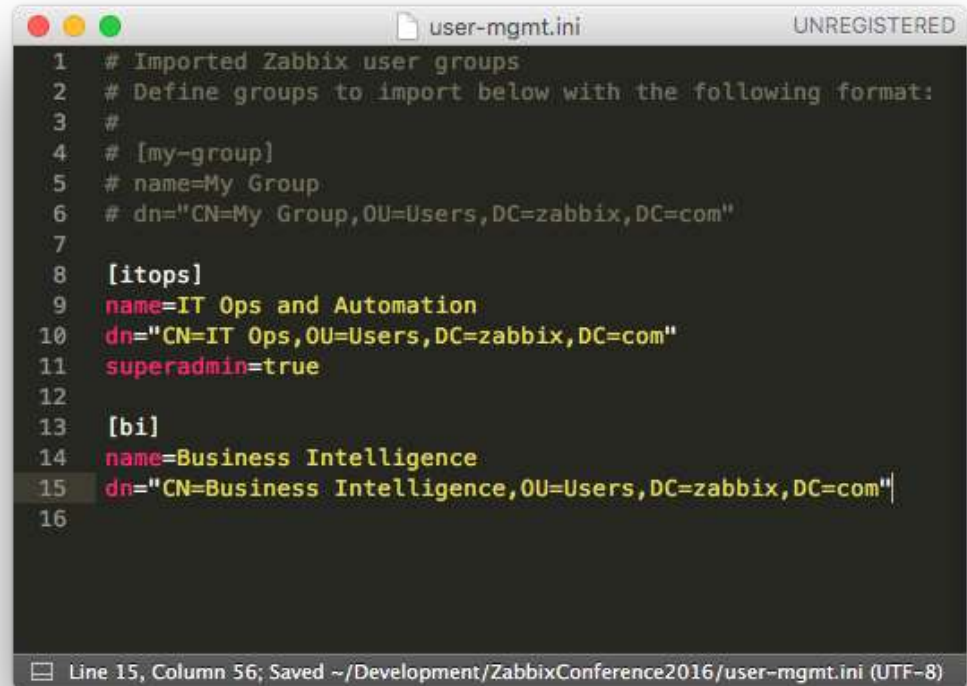
Host and User Management

- Hourly cron jobs
- Modelled 'views' from data sources
- Remediate differences via Zabbix API



User Management

- INI file configuration
- Define LDAP groups
- Script queries AD/LDAP
- Sync users/groups via Zabbix API



```
user-mgmt.ini UNREGISTERED
1 # Imported Zabbix user groups
2 # Define groups to import below with the following format:
3 #
4 # [my-group]
5 # name=My Group
6 # dn="CN=My Group,OU=Users,DC=zabbix,DC=com"
7
8 [itops]
9 name=IT Ops and Automation
10 dn="CN=IT Ops,OU=Users,DC=zabbix,DC=com"
11 superadmin=true
12
13 [bi]
14 name=Business Intelligence
15 dn="CN=Business Intelligence,OU=Users,DC=zabbix,DC=com"
16

Line 15, Column 56; Saved ~/Development/ZabbixConference2016/user-mgmt.ini (UTF-8)
```

Host Management

- XML configuration of data sources and views
- Query hosts in CMDB via SQL
- Sync hosts, groups, templates and trigger dependencies via Zabbix API

```
host-mgmt.xml UNREGISTERED
1 <?xml version="1.0"?>
2 <!-- Configuration for Zabbix import scripts -->
3 <configuration sqlpath="sql">
4   <datasources>
5     <datasource name="CMDB">
6       <description>Configuration Management Database</description>
7       <dsn>DBI:Sybase:server=cndb;database=cndb;</dsn>
8       <username>zabbix</username>
9       <password>Shhhhhhh...</password>
10      <views>
11        <view name="DCServers" key="name" target="hosts">
12          <description>Defines Data Centre Servers</description>
13          <query>file:dc-servers.sql</query>
14          <groups>
15            <!-- Zabbix Hostgroups -->
16            <group category="hostgroups" name="{os} Servers" />
17
18            <!-- Zabbix Templates -->
19            <group category="templates" name="Template {os}" />
20          </groups>
21          <list>
22            <list name="macros">
23              <key name="id" />
24            </list>
25            <list name="inventory">
26              <key name="location" />
27              <key name="os" />
28              <key name="vendor" />
29              <key name="model" />
30              <key name="serialno_a" />
31            </list>
32          </list>
33        </view>
34      </views>
35    </datasource>
36  </datasources>
37 </configuration>
38
```

SNMP Template Generator

- Parses MIB files
- Generates Zabbix Template XML files
- <https://github.com/cavaliercoder/mib2zabbix>



```
$ mib2zabbix.pl --enable-items --oid 1.3.6.1.2.1.2.2 > template.xml
```


PDH Template Demonstration

- PowerShell Module
- Query performance counter API
- Generates Zabbix template XML
- <https://github.com/cavaliercoder/ZabbixTemplates>



```
> Export-CounterSetToZabbixTemplate -CounterSet LogicalDisk,PhysicalDisk | Out-File template.xml
```

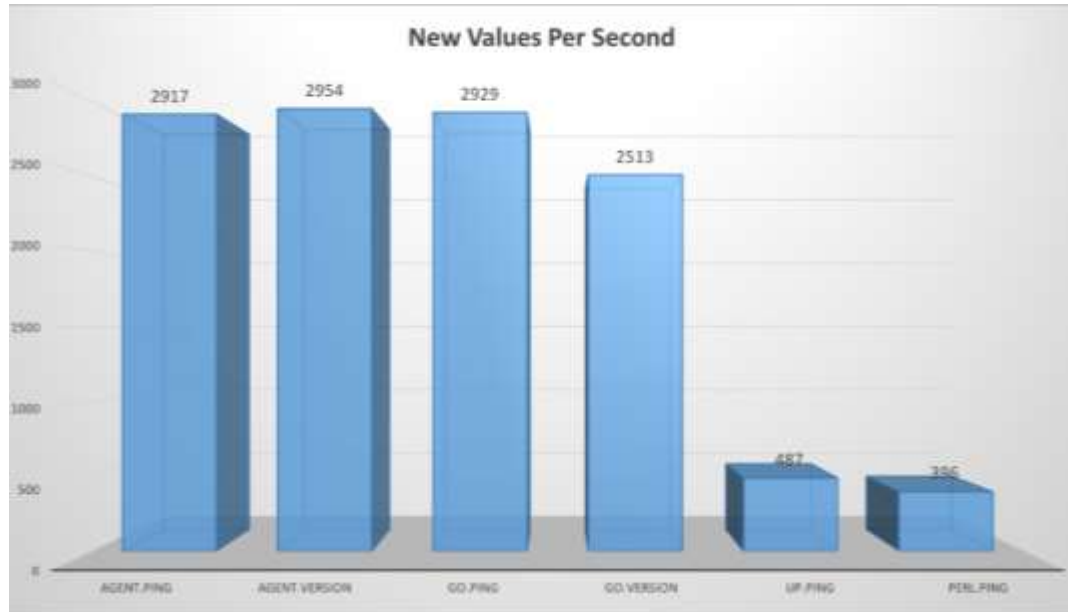


- Multi-threaded Go binary
- Queries the Zabbix Agent
- Test for performance and stability
- https://github.com/cavaliercoder/zabbix_agent_bench

Agent Stress Test

Modules, why bother?

- Better performance
- Simpler packaging
- Smaller footprint



```
# test built-in item
$ zabbix_agent_bench -key agent.ping

# test simple fork
$ zabbix_agent_bench -key "system.run[/bin/echo 1]"

# test simple script
$ zabbix_agent_bench -key "system.run[/usr/bin/python -c 'print 1']"

# test module item
$ zabbix_agent_bench -key dummy.ping

# regression test multiple keys for CI/CD
$ zabbix_agent_bench -iterations 1 -strict -keys appkeys.conf
```

References

Kinetic IT

<https://www.kineticit.com.au/>

ZabbixTemplates - Powershell module

<https://github.com/cavaliercoder/ZabbixTemplates>

mib2zabbix – SNMP Template generator

<https://github.com/cavaliercoder/mib2zabbix>

zabbix_agent_bench – Agent benchmark tool

https://github.com/cavaliercoder/zabbix_agent_bench

WiX MSI template for Zabbix Windows Agent

<https://github.com/cavaliercoder/zabbix-msi>

PostgreSQL agent module

<https://github.com/cavaliercoder/libzbxpgsql>



Many thanks