mruby extension module for monitoring system

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Agenda

- **Introduction** of MIRACLE ZBX
- **What** is mruby extension module
- **Why** mruby module is needed
- **Structure** of mruby extension module
- **How to use** mruby extension module

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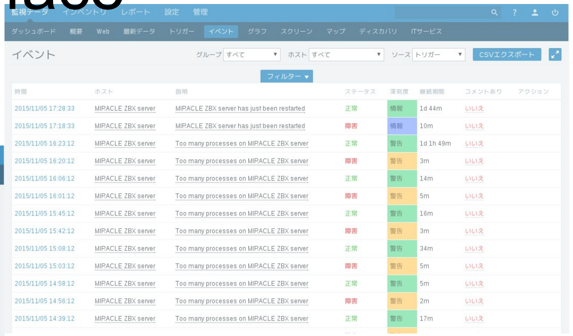
Introduction of MIRACLE ZBX (1/2)

- Monitoring system developed in MIRACLE LINUX
- Forked from OSS Zabbix under GPL2
  - Support many monitoring types including agent, ssh, SNMP, IPMI, etc...
- Add some special features that we need
  - Additional event log filter in Web interface
  - Additional runtime configuration
  - Customized Windows eventlog key
  - etc...



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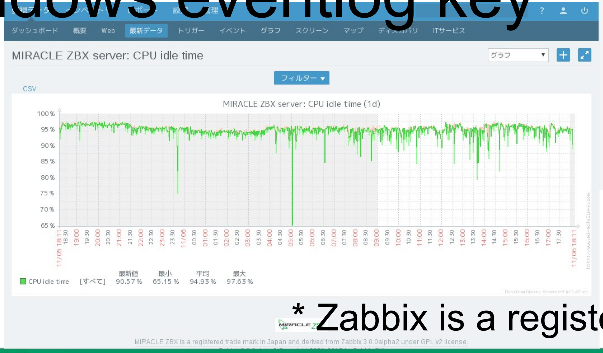
CSVエクスポート
フィルター ▾

イベント

時間	ホスト	説明	ステータス	深刻度	継続期間	コメントあり	アクション
2015/11/05 17:28:33	MIRACLE ZBX server	MIRACLE ZBX server has just been restarted	正常	情報	1d 44m	いいえ	
2015/11/05 17:18:33	MIRACLE ZBX server	MIRACLE ZBX server has just been restarted	障害	情報	10m	いいえ	
2015/11/05 16:23:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	正常	警告	1d 1h 49m	いいえ	
2015/11/05 16:20:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	障害	警告	3m	いいえ	
2015/11/05 16:06:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	正常	警告	14m	いいえ	
2015/11/05 16:01:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	障害	警告	5m	いいえ	
2015/11/05 15:45:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	正常	警告	16m	いいえ	
2015/11/05 15:42:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	障害	警告	3m	いいえ	
2015/11/05 15:08:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	正常	警告	34m	いいえ	
2015/11/05 15:03:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	障害	警告	5m	いいえ	
2015/11/05 14:58:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	正常	警告	5m	いいえ	
2015/11/05 14:56:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	障害	警告	2m	いいえ	
2015/11/05 14:39:12	MIRACLE ZBX server	Too many processes on MIRACLE ZBX server	正常	警告	17m	いいえ	



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CSV
MIRACLE ZBX server: CPU idle time (1d)
100 %
95 %
90 %
85 %
80 %
75 %
70 %
65 %
11/05 18:11
11/06 18:11

MIRACLE ZBX server: CPU idle time

		最新値	最小	平均	最大
🟩 CPU idle time	[すべて]	90.57 %	65.15 %	94.93 %	97.63 %

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Introduction of MIRACLE ZBX (2/2)

- Customizable monitoring features
  - “UserParameter” feature
    - Execute any command from monitoring agent process and get the result
  - “External check” feature
    - Execute any command from monitoring server process and get the result
  - “Loadable module” feature in C
    - Execute C module function and get the result

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Introduction of MIRACLE ZBX (2/2)

- Customizable monitoring features
  - “UserParameter” feature
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I made mruby extension module by this feature

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What is mruby extension module

- Execute mruby function in mruby file and return the result to monitoring server
  - Similar as mruby version of “Loadable module”

```
key: mruby.module[sample.rb,args]
```

- Execute mruby code string and return the result to monitoring server

```
key: mruby.eval[p "hello world"]
```

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Why mruby module is needed

- **Easier** than C
- **Faster** than scripting language
- Embed to existing process, **no fork**

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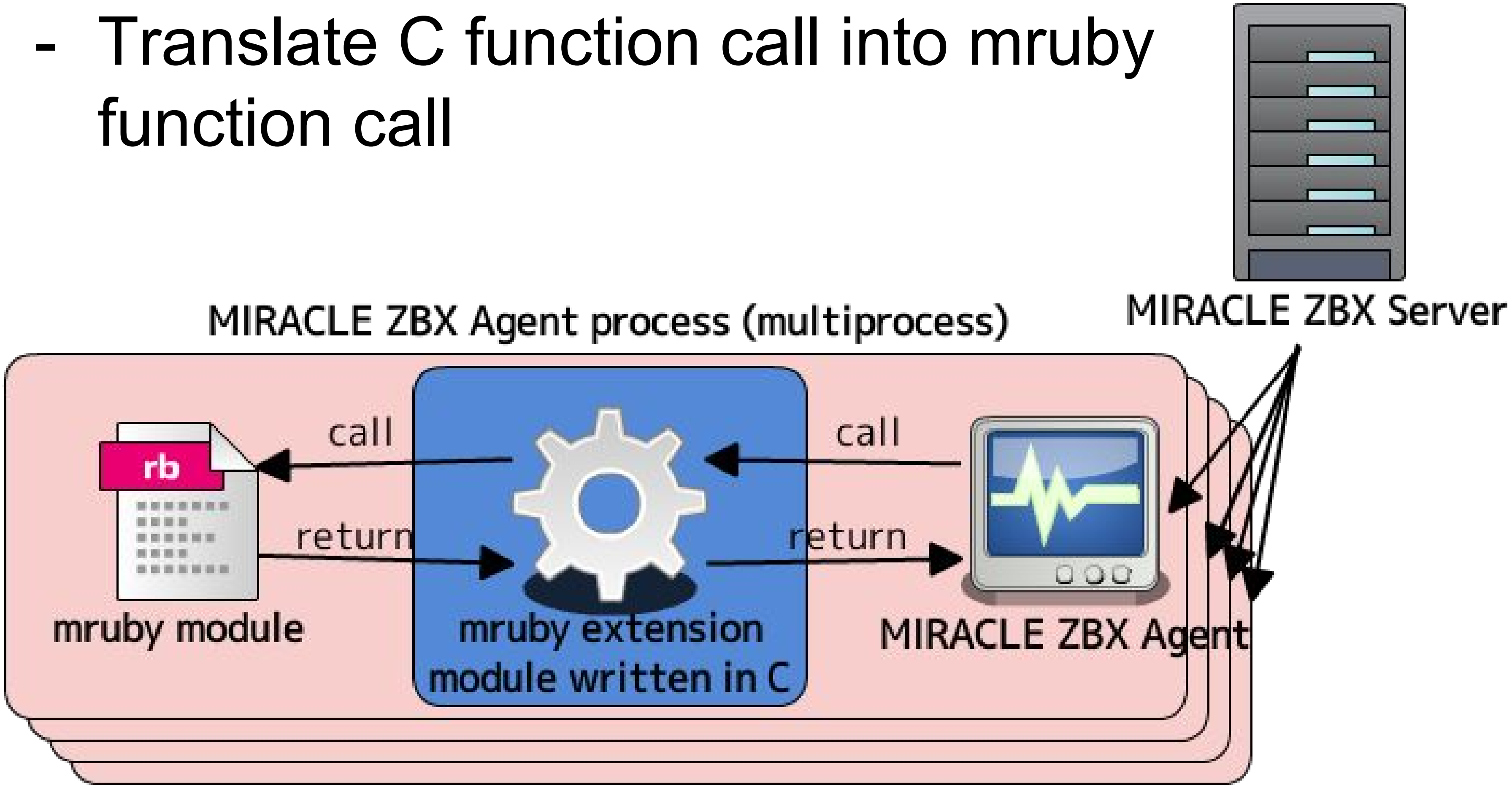
Structure of mruby extension module

Overview of mruby extension module

- Work as a C loadable module
- Translate C function call into mruby function call


MIRACLE ZBX Agent process (multiprocess)
MIRACLE ZBX Server
call
call
rb
return
return
mruby module
mruby extension module written in C
MIRACLE ZBX Agent

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When the mruby code is called

- zbx_module_init() in "MonitoringModule" class
  - When the agent process start

- zbx_module_run(*args*) in "MonitoringModule" class
  - When the monitoring key is monitored
  - The function can have Arguments.

```
key: mruby.module[sample.rb,arg1,arg2,...]
mruby function: zbx_module_run(arg1,arg2,...)
```

- zbx_module_uninit() in "MonitoringModule" class
  - When the agent process stop

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Problems with multiprocess

Monitoring agent works in multiprocess

- For sharing data, **shared memory** is needed.

- For locking, **semaphore lock** is needed.

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Shared memory

mruby-cache

https://github.com/charlescui/mruby-cache

- Made by CharlesCui
- “Mruby Inter Process Share Memory. Exchange memory space with mmap for multi mruby process.”

```
cache = Cache.new :namespace=>"foo"
cache["key"] = "value"
cache["key"]    # => "value"
```

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Semaphore lock

mruby-semlock

https://github.com/tszki/mruby-semlock

- Made for mruby extension module
- Implementation to use semaphore lock

```
sem = Semlock.new "./sample.rb", 0, 1, 0600
# keyfile, prj_num, sem_num, permission
sem.lock(0)  # lock with waiting
sem.unlock(0)  # unlock
status = sem.trylock(0)  # lock without waiting
sem.unlock(0) if status  # unlock
sem.remove  # remove semaphore
```

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Sample code in multiprocess

Updating shared variable safely

```
cache = Cache.new :namespace=>"foo"
sem = Semlock.new "./sample.rb", 0, 1, 0600
cache["key"] = "0"
sem.lock(0)  # lock
cache["key"] = (cache["key"].to_i + 1).to_s
# updating safely
sem.unlock(0)  # unlock
sem.remove
```

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Other included mrbgems

- mruby-base64
- mruby-cache
- mruby-curl
- mruby-digest
- mruby-dir
- mruby-http
- mruby-httprequest
- mruby-io
- mruby-json
- mruby-marshal
- mruby-mtest
- mruby-mutex
- mruby-oauth
- mruby-pack
- mruby-polarssl
- mruby-process
- mruby-semlock
- mruby-simplehttp
- mruby-sleep
- mruby-socket
- mruby-userdata

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How to use mruby extension module

Installation

For MIRACLE LINUX v7 and other RHEL7 compatible distributions

- MIRACLE ZBX 3.0.0alpha2-1

http://ftp.miraclelinux.com/zbx/preview/miracle-zbx-3.0.0alpha2-pkgs.tar.gz

```
$ tar xzvf miracle-zbx-3.0.0alpha2-pkgs.tar.gz
$ cd miracle-zbx-3.0.0alpha2-pkgs/x86_64
$ sudo rpm -ihv miracle-zbx-3.0.0alpha2-1.ML7.x86_64.rpm \
  miracle-zbx-agent-3.0.0alpha2-1.ML7.x86_64.rpm
```

- mruby extension module

Project page:

https://github.com/tszki/mruby-extension-module-for-miracle-zbx/

mruby extension module rpm:

https://github.com/tszki/mruby-extension-module-for-miracle-zbx/raw/master/rpm/mruby-extension-module-for-miracle-zbx-1.0.0-1.ML7.x86_64.rpm

```
$ sudo rpm -ihv \
  mruby-extension-module-for-miracle-zbx-1.0.0-1.ML7.x86_64.rpm
```

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Setting

- "loadable module" setting is set by installed conf file.

/etc/zabbix/zabbix_agentd.d/mruby_extension_module.conf

```
LoadModulePath=/usr/lib64/zabbix/modules
LoadModule=mruby_extension_module.so
```

- Copy sample mruby files

```
# cp -p /usr/lib64/zabbix/modules/mruby_module/sample.rb.sample \
  /usr/lib64/zabbix/modules/mruby_module/sample.rb
```

- Start agent service

```
# systemctl start zabbix-agent.service
```

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Checking

- mruby.module[]

```
$ zabbix_get -s 127.0.0.1 -k 'mruby.module[sample.rb]'
Hello world. I drunk 1 cups of water

$ zabbix_get -s 127.0.0.1 -k 'mruby.module[sample.rb,
Hi.]'
Hi. I drunk 2 cups of water
```

- mruby.eval[]

```
$ zabbix_get -s 127.0.0.1 -k 'mruby.eval[p "hello
world"]'
hello world
```

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Demo

MIRACLE