Drools 6.3.0.FINAL
Weight Watcher2 Demo

Stateless CEP Decision Server

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1 Introduction

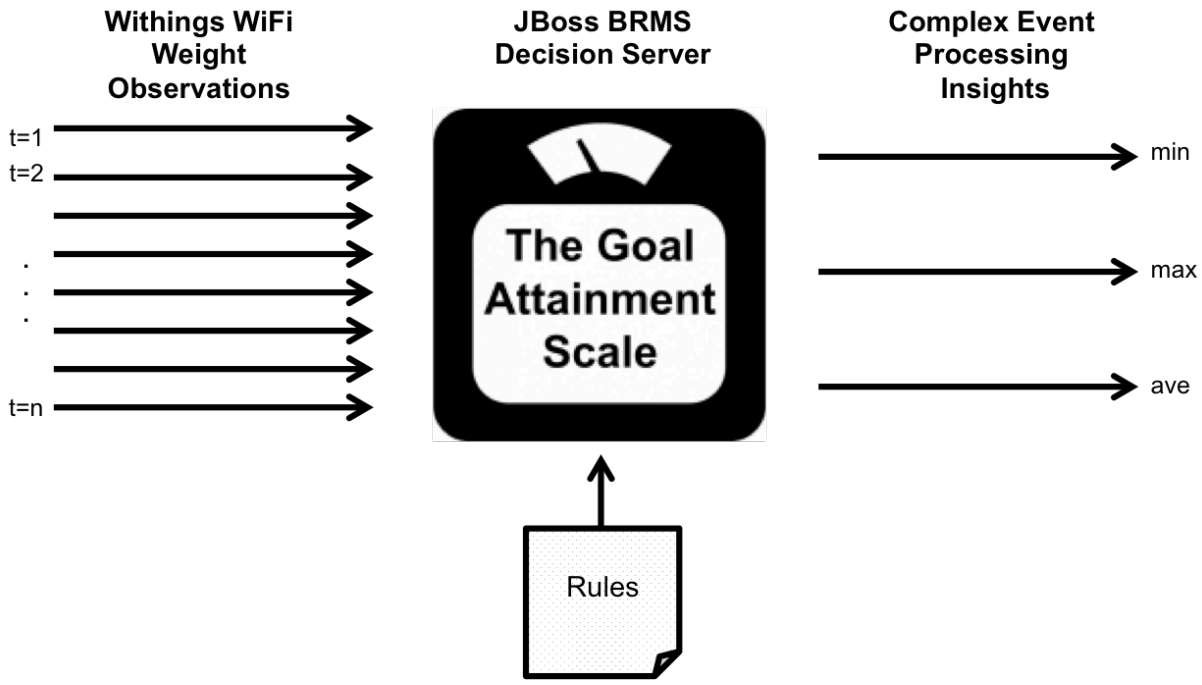
Interested in a demo that showcases the Drools (6.3.0.FINAL) Decision Server? Then look here. The application is a stateless Decision Server with complex event processing (CEP) support based on a pseudo clock.

An example use case demonstrated includes a (REST) client sending a time series of *facts* in the form of weight observations to the Decision Server. The Decision Server then reasons over the inputs to derive CEP insights such as average weight, least weight and weight change of a rolling time window. These insights are returned to the calling client as *facts*.

This is a facts-in-facts-out (FIFO) pattern using a standardized fact interface representation. This technique makes it easier for a simple thin client application such as cURL, SoapUI or RStudio to send request/response payloads to the Decision Server without knowledge of the underlying rules data model.

http://blog.emergile.com/2014/12/08/really-simple-rules-service/

Note that by porting to the Drools 6.3.0.FINAL release, this demonstration application is ready for the upcoming OpenShift Enterprise V3.1 and JBoss BRMS 6.2 releases. Docker image based deployments are supported in both standalone and OpenShift V3 mode.



2 Setup

2.1 Image Download

The runtime artefacts for this demonstration application have all been packaged up according to the Docker container specification. The various Docker images can be downloaded as follows:

```
# The Decision Server as a Docker image
$ docker pull spicozzi/weightwatcher2

# A companion PHP website with test cases
$ docker pull spicozzi/testdrive2

# An optional RStudio Server image with R test case included
$ docker pull spicozzi/rstudio2

# An optional JBoss Drools workbench image used for rule changing use case
$ docker pull spicozzi/workbench2
```

2.2 Source Download

Repositories containing source code, content and support files related to the three images listed above can be inspected as per the GitHub links below.

```
https://github.com/StefanoPicozzi/weightwatcher2

https://github.com/StefanoPicozzi/testdrive2

https://github.com/StefanoPicozzi/RStudio2

https://github.com/StefanoPicozzi/workbench2
```

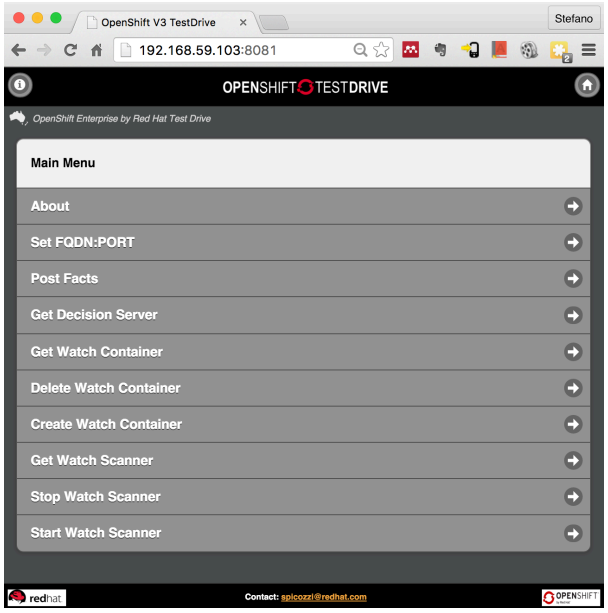
3 Running the Basic Demos

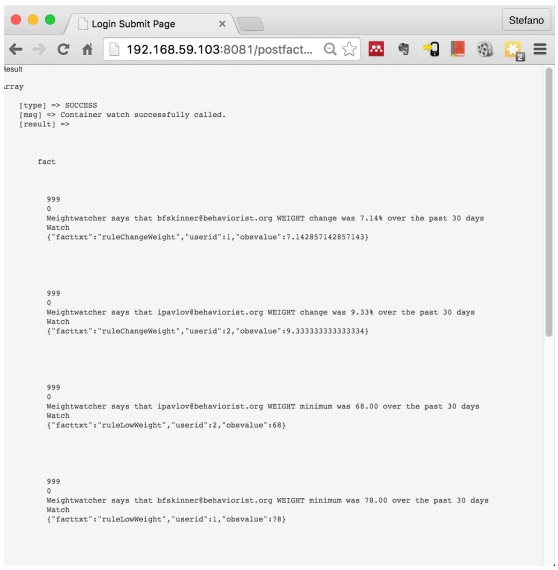
3.1 Launch Container Instances

```
# Launch 3 terminal windows and run the container instances in each

# Find the IP_ADDRESS used by your instances, e.g.
$ boot2docker ip

# Terminal 1
$ docker run -it -p 81:80 spicozzi/testdrive2

# Terminal 2
$ docker run -it -p 8080:8080 spicozzi/weightwatcher2

# Terminal 3 (optional)
$ docker run -it -p 8087:8087 spicozzi/rstudio2
```

3.2 Companion Website Test Case

Open your browser at the IP_ADDRESS and port (8081) of the PHP companion application. Set the FQDN:PORT to point to your Decision Server instance. Then try the Post Facts menu option to verify that it is accepting requests correctly. Output should look similar to below in the side-by-side screen shots. The other choices refer to other optional Decision Server API features and test cases that are documented separately.





3.3 Simple cURL Test Case

Some simple cURL scripts have also been supplied to test the health of your configuration are located under the /tools/cURL subdirectory of the weightwatcher2 GitHub repository. These are similar to the test cases available at the companion website. Edit each script to change the http:// FQDN end point to reflect your deployment as follows:

```
$ cd <path-to-git-download>
$ cd tools/cURL

# Edit the post-facts.sh script and change the FQDN as necessary
$ ./post-facts.sh
# Check for 200 http response code
# Response payload should show list of JBoss BRMS CEP notifications
```

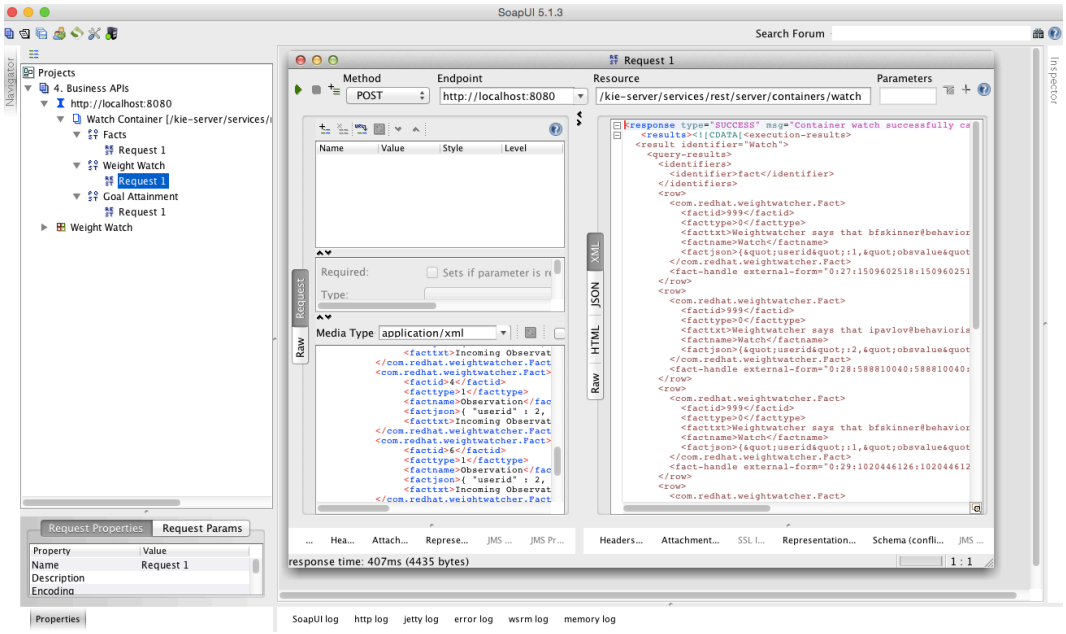
3.4 SoapUI Samples

This example assumes you have SoapUI installed on your workstation. Launch SoapUI and then import the project with a name that includes the label "Business APs" as located at weightwatcher2/tools/SoapUI. The 3 supplied resources and REST POST requests are samples representing the following.

"Facts" shows a simple request in which a request payload of facts are *inserted* into the Decision Server knowledge and then a *query* is issued to verify this action has been successful.

The "Weight Watch" sample shows an invocation in which a set of facts containing weight measurements is sent to the Decision Server. CEP rules are then applied to derive insights as per the response payload. The request consists of facts representing Participant, Goal and Observation data records. The Participant records capture details of the user, Goal captures the Participant's target weight objectives and Observation records a time series of weight measurements. The response payload then returns a set of facts reporting minimum, maximum and weight change statistics over a sliding time window.

The "Goal Attainment" sample demonstrates a use case in which the Participant has elected to enter into a period of intermittent fasting, known as the Fast Diet http://thefastdiet.co.uk/. The GAS fact represents the Participant's number of fasting day goals over the week, described in ranges of worst through to best outcomes, refer http://en.wikipedia.org/wiki/Goal_Attainment_Scaling for details on the method. The Observation records then report back actual days of fasting in the previous weeks. The Decision Server then responds back with performance against goals. The GAS fact table is a candidate for remodelling using, e.g. a Guided Decision Tables.

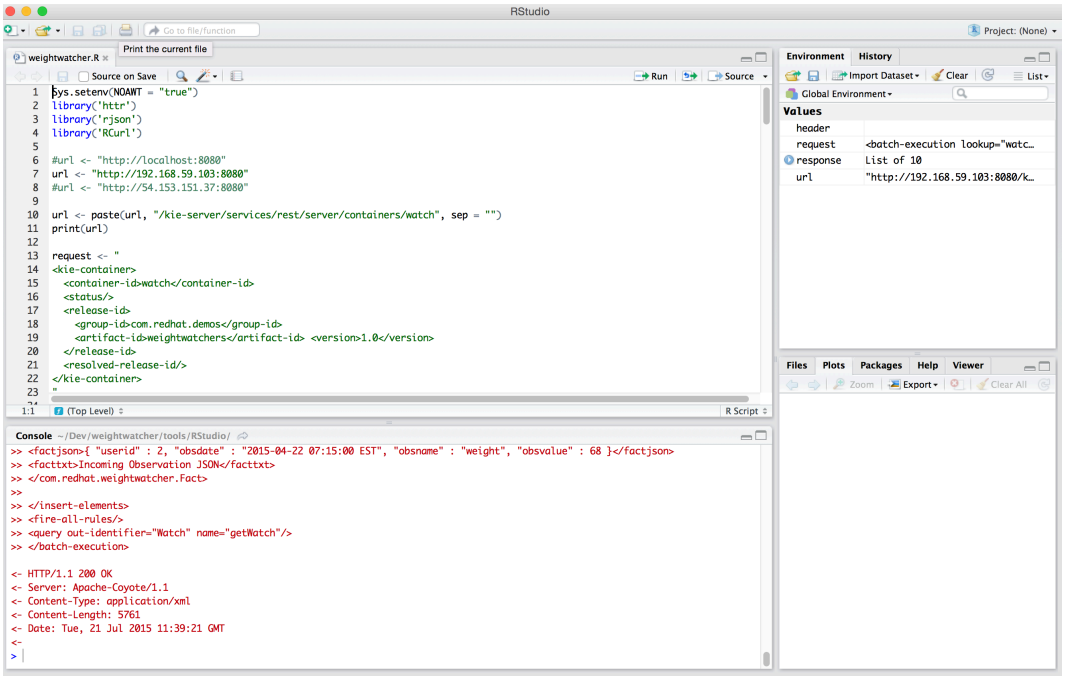


3.5 R using RStudio

An R script based sample showing how to interact with the Weight Watcher Services is located under the weightwatcher2/tools/RStudio directory. You can reproduce this test case either using a local instance of RStudio on your workstation or by (preferred) using the prebuilt RStudio Server container image. Note that you may need to install a few missing packages expected of the supplied .R script if using a local RStudio installation. RStudio Server instructions are as follows:

```
# Find the IP_ADDRESS for your docker container instances
$ boot2docker ip

# Point your favourite browser at the RStudio Server cointainer
$ firefox http://IP_ADDRESS:8787

# Login as guest/guest
# Find, edit the url and the source weightwatcher.R to run
```

Edit the weightwatcher.R script url end point to reflect your environment, then source to run.



4 Running the Changing Rules Demo

This demonstration shows a use case in which rule are changed using the JBoss Business Central studio and then those changes reflected in the Decision Server. The basic steps are as follows:

1. (Re)launch the JBoss Drools Workbench container (workbench2) with the Maven repository mounted as an external volume (workbench2/m2)
2. (Re)launch the Decision Server container (weightwatcher2) with the Maven repository mounted as an external volume (weightwatcher2/m2)
3. (Re)launch the companion website PHP application (testdrive2)
4. From testdrive2 Browser, click Start Scanner to start the Decision Server scanner
5. From workbench2 Workbench Browser, make some changes to your rules, save them and then build-and-deploy the artefact. Login to Workbench using IP_ADDRESS:8018/drools-wb and credentials admin/admin
6. From the workbench/m2 file system, copy all the contents in com/redhat/demos/weightwatchers/1.0 to your clipboard
7. From the weightwatcher2/m2 file system, paste the clipboard contents to com/redhat/demos/weightwatchers/1.0
8. From testdrive2 Browser, click Post Facts and verify that the changes have been applied
9. From workbench2 container window, check the log for evidence of a change to the rule jar file
10. From weightwatcher2 container window, check the log for evidence of a scanner event to for a new rule jar file

For steps 1 and 2, check the sample Docker launch scripts supplied at the GitHub repository for examples on how to approach the volume attachment requirement. These instructions assume familiarity with authoring rules using Drools Workbench. Steps 6 and 7 can be automated for more real-life scenarios using your, e.g. favourite CI/CD tooling. More detailed documentation will follow later.

5 OpenShift V3.1

OpenShift V3 can load and run an arbitrary Docker image. The following instructions assume you have a working OpenShift V3 installation. We are going to create three OpenShift applications for the weightwatcher Decision Server, the companion website and another to host RStudio Server. Trying out the various basic test cases is just as documented previously for the basic Docker deployment scenario and so are not repeated here. The more advanced rule change use case will be documented later. Deploy. Enjoy!

5.1 OpenShift Environment Setup

```
# Pull down the image
$ su – root

# Set appropriate OpenShift security context constraints
$ oc edit scc restricted
> change runAsUser.Type to RunAsAny

# Assume we have a Development user called marina
# Create project and ensure (optionally) that pods land in certain nodes

$ oadm new-project weightwatcher --node-selector='region=primary'
$ oadm policy add-role-to-user admin <DEVUSER> -n weightwatcher

# Pull down docker images on each user workload node
# for each user workload node <NODE>

$ ssh root@<NODE>
$ docker pull spicozzi/weightwatcher2
$ docker pull spicozzi/rstudio2
$ docker pull spicozzi/testdrive2
```

5.2 Create OpenShift Applications

```
# For instructions below replace <PARAMETER> to reflect your environment

# Login as an OpenShift V3.0 user <DEVUSER>
$ su - <DEVUSER>

# Authenticate to the OpenShift master at <MASTER-FQDN>:<PORT>
$ oc login -u <DEVUSER> --insecure-skip-tls-verify --
server=https://<MASTER-FQDN>:<PORT>

# Switch to the weightwatcher project
$ oc get projects
$ oc project weightwatcher

# Create an OpenShift application
$ oc new-app spicozzi/weightwatcher2
$ oc new-app spicozzi/testdrive2
$ oc new-app spicozzi/rstudio2

$ oc expose service weightwatcher2 --name=weightwatcher2-route --
hostname=weightwatcher2.<CLOUDAPPS-FQDN>
$ oc expose service rstudio2 --name=rstudio2-route --
hostname=rstudio2.<CLOUDAPPS-FQDN>
$ oc expose service testdrive2 --name=testdrive2-route --
hostname=testdrive2.<CLOUDAPPS-FQDN>

$ oc describe pod weightwatcher2
$ oc describe pod rstudio2
$ oc describe pod testdrive2
```

6 OpenShift Origin Vagrant All-In-One

The all-in-one Vagrant virtual machine (VM) for OpenShift Origin is located at http://www.openshift.org/vm/ . Follow the instructions to download and install the VM. Once completed do the following. Note that the current VM setup instructions do not currently include a DNS and so exposing routes to access services from your local Browser such as workbench2 are not available within the VM.

6.1 Setup as Vagrant root User

```
# cd to the location of your OpenShift Origin vagrant image
$ vagrant up

$ vagrant ssh
$ su -
Password: vagrant

# Pull down the images
$ docker pull spicozzi/weightwatcher2
$ docker images
$ oc get images

# Set appropriate OpenShift security context constraints
$ oc edit scc restricted
> change runAsUser.Type to RunAsAny

# Clone done the weightwatcher2 distribution
$ cd ~
$ git clone https://github.com/StefanoPicozzi/weightwatcher2
```

6.2 Setup as OpenShift Origin admin User

```
# From a separate terminal window cd to location of your vagrant image
$ vagrant status

# Now login as a OpenShift Developer admin
$ oc login
Username: admin
Password: password

$ oc delete project weightwatcher
$ oc new-project weightwatcher
$ oc new-app spicozzi/weightwatcher2

# Note the Endpoint for the PORT 8080-tcp entry as <FQDN:PORT>
$ oc describe service weightwatcher2

# Wait for the pod status as Running then note the pod name <PID>
$ oc get pods

$ oc logs –f <PID>
```

6.3 Basic Test as Vagrant root User

```
# Return to the terminal window where you are the Vagrant root user
$ cd ~/weightwatcher2/tools/cURL

# Edit the .sh scripts to set <FQDN:PORT> to match your setup
$ vi *.sh

$ ./post-facts.sh
$ ./start-scanner.sh
```

6.4 Rule Changes using oc rsync

6.4.1 Rule Changes using local Drools Workbench

```
# To make rule changes we need to launch an instance of drools_wb

# From a terminal window using eg boot2docker
$ docker pull spicozzi/workbench2

# Note the <IP> return from this command
$ boot2docker ip

$ cd ~
$ git clone https://github.com/StefanoPicozzi/workbench2
$ cd workbench2
$ ./docker-run-with-m2-attached.sh

# Now launch a Browser and point it to <IP>:8180/drools_wb
# Login as admin/admin

# Use the drools_wb to make some changes to a DRL file
```

6.4.2 oc rsynch Rule Changes as OpenShift Origin admin User

```
$ cd ~/workbench2/m2
$ oc rsync repository <PID>:/opt/jboss/.m2

# Check that the scanner has picked up the change
$ oc logs –f <PID>
```

6.4.3 Verify Rule Change as Vagrant root User

```
# Return to the terminal window where you are the Vagrant root user
$ cd ~/weightwatcher2/tools/cURL

$ ./post-facts.sh
# Now check outputs and log files as necessary to verify change applied
```

A Appendix

A.1 Useful (boot2docker) Docker Commands

```
# Find <IP> of boot2docker virtual machine
$ boot2docker ip

# If you encounter strange problems while pull/push of images
$ boot2docker stop
$ boot2docker start

# List of docker images
$ docker images

# List of running docker containers showing <CONTAINER_ID>
$ docker ps –l

$ docker attach <CONTAINER_ID>

# Kill a running docker container with <CONTAINER_ID>
$ docker rm –f <CONTAINER_ID>

# Pull down a docker image
$ docker pull spicozzi/nginx

# Commit changes in a running Container as an image
# From another terminal get the <CONTAINER_ID>
$ docker ps -l
$ docker commit <CONTAINER_ID> spicozzi/nginx

# Assume you have a running container named weightwatcher1
$ docker logs -f weightwatcher1
$ docker rm -f weightwatcher1

# Remove all running containers
$ docker rm -f $(docker ps -aq)

# Remove all untagged images
$ docker rm -f $(docker images | grep "^<none>" | awk "{print $3}")
```

A.2 Useful OpenShift Commands

```
# To scale up replicas
$ oc scale dc weightwatcher2 --replicas=2

# Tail the log file for the created pod
$ oc get pods
$ oc logs -f <PODNAME>

# If you make any errors just delete the <PROJECT> and repeat
$ oc delete project <PROJECT>
```

A.3 DNS for OpenShift Origin All-in-one Image

```
# cd to the location of your OpenShift Origin vagrant image
$ vi Vagrantfile
config.vm.network "private_network", ip: "192.168.33.10"

$ vagrant up
$ vagrant ssh
$ su –
Password: vagrant

$ yum install dnsmasq
$ systemctl stop NetworkManager
$ systemctl enable dnsmasq

$ vi /etc/host
192.168.33.10 master.example.com openshift

# Find 10.x.x.x address
$ ifconfig | grep 10.

# Change openshift mster-config dnsConfig to listen using 10.x.x.x
$ locate master-config
$ vi <LOCATION>/master-config.yaml
dnsConfig:
    bindAddress: 10.x.x.x:53

$ vi /etc/resolv.conf
search cloudapps.example.com example.com redhat.com
nameserver 192.168.33.10
nameserver x.x.x.x
nameserver x.x.x.x

$ vi /etc/dnsmasq.conf
strict-order
```

```
domain-needed
local=/example.com/
bind-dynamic
address=/.cloudapps.example.com/192.168.33.10
log-queries
#resolv.conf=/etc/resolv.conf.upstream

$ systemctl restart dnsmasq
$ systemctl disable NetworkManager
$ yum remove NetworkManager
```

```
# From Mac OS/X desktop

# Menu > System Preference > Network
# Select your network connection
> Advanced …
> DNS

DNS Servers:
# Add 192.168.33.10 to top of list

Search Domains:
# Add cloudapps.example.com to top of list
# Add example.com to top of list

# Flush cache using
$ sudo killall –HUP mDNSResponder
```