

Build your first serverless application on Apache OpenWhisk

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Self Introduction

- Ying Chun Guo “Daisy”
 - IBM senior software engineer
 - 9 years experience in open source communities, i.e. OpenOffice and OpenStack
 - Initiator of OpenStack I18n team, the first PTL
 - Apache OpenWhisk committer



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Agenda

- Set up your own OpenWhisk environment
- Basic OpenWhisk programming model
- Advanced OpenWhisk programming model
- Demo
- Summary



Set up your own OpenWhisk env

- Quick start using Vagrant *
- Native development *
 - Mac
 - Ubuntu
- Deploying distributed OpenWhisk using Ansible
 - https://github.com/apache/incubator-openwhisk/blob/master/ansible/README_DISTRIBUTED.md
- Deploying OpenWhisk on Kubernetes
 - <https://github.com/apache/incubator-openwhisk-deploy-kube>



Set up your own OpenWhisk env: Quick start using Vagrant

- Supported OS: Mac OS X El Capitan, Ubuntu 14.04.3 LTS and Windows.
- Requirements
 - VirtualBox 5.1.22
 - Vagrant 1.9.5
- Commands:
 - `git clone --depth=1 https://github.com/apache/incubator-openwhisk.git openwhisk`
 - `cd openwhisk/tools/vagrant`
 - `./hello`



Set up your own OpenWhisk env: Native development

- Supported OS: Ubuntu 14.04.3 LTS, Mac
- Requirements
 - VirtualBox 5.1.22
 - Vagrant 1.9.5
- Commands:
 - #1 Install all required software
 - `git clone --depth=1 https://github.com/apache/incubator-openwhisk.git openwhisk`
 - `cd openwhisk/tools/ubuntu-setup`
 - `./all.sh`
 - #2 Config a data store: CouchDB/Cloudant
 - #3 `./gradlew distDocker`

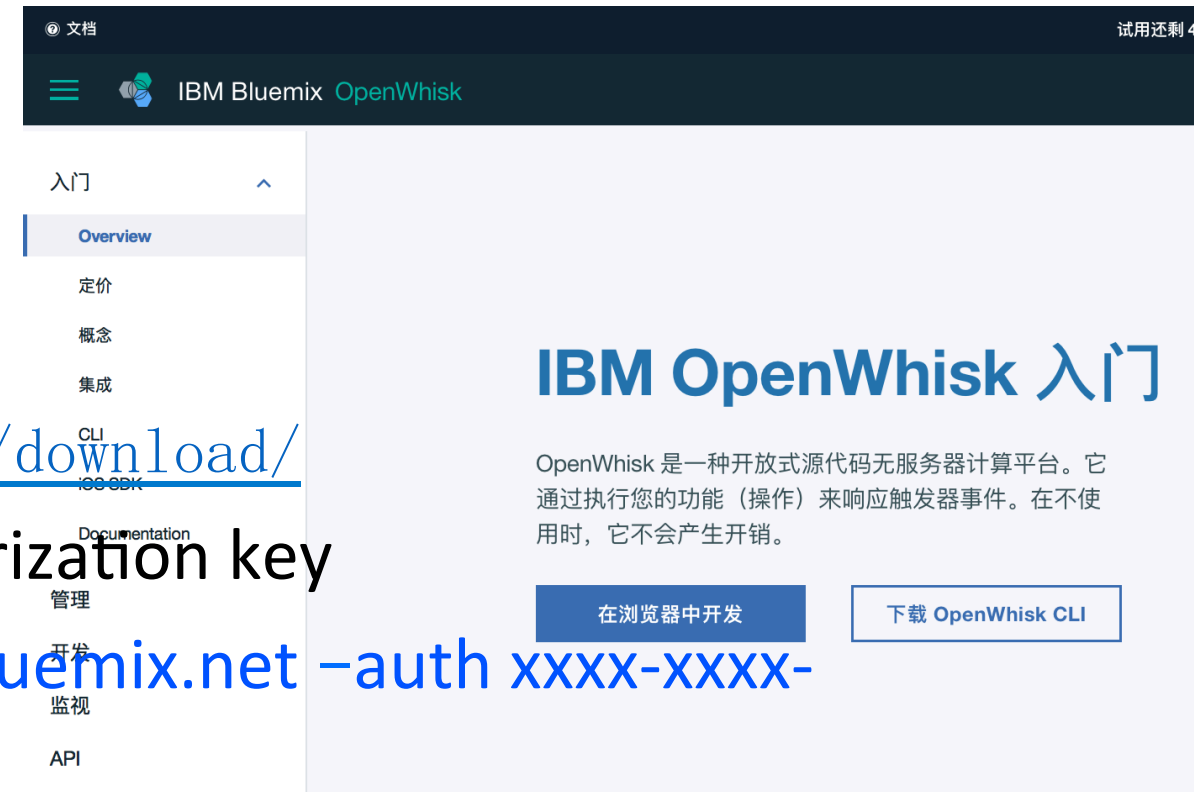
<https://github.com/apache/incubator-openwhisk/blob/master/tools/ubuntu-setup/README.md>

<https://developer.ibm.com/code/2016/05/23/setup-openwhisk-use-local-couchdb/>



Set up your own OpenWhisk env: Using IBM Cloud Platform

- Register an account on <https://console.ng.bluemix.net>
- Download OpenWhisk CLI: <https://openwhisk.ng.bluemix.net/cli/go/download/>
- Config OpenWhisk namespace and authorization key
`wsk property set --apihost openwhisk.ng.bluemix.net --auth xxxx-xxxx-xxxx-xxxx`



Basic OpenWhisk programming model

- Action
- Trigger
- Rule
- Package

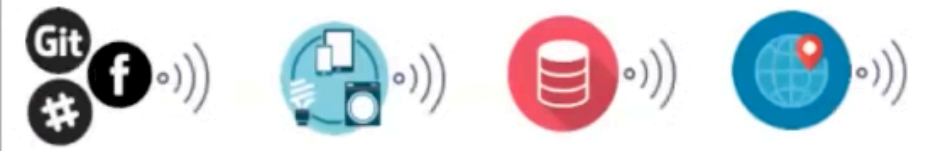
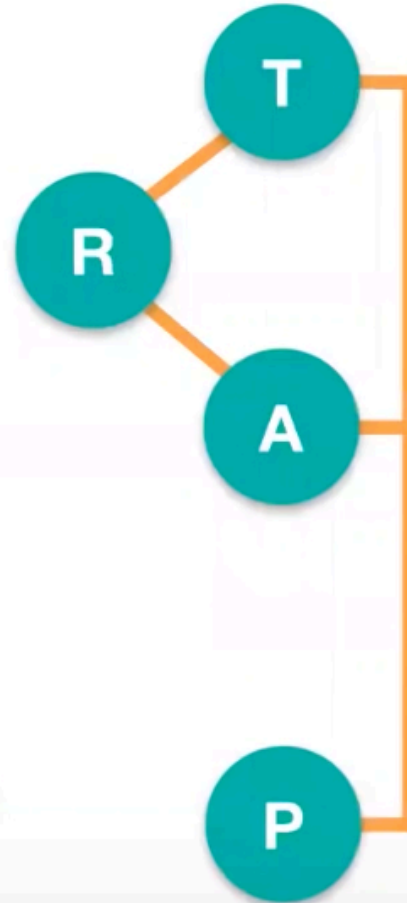


OpenWhisk Programming Model

Data sources define events they emit as **Triggers**.

Developers map **Actions** to **Triggers** via **Rules**.

Packages provide integration with external services.



Action

- A** *Code that runs in response to an event (that is, an event handler)*



<https://github.com/openwhisk/openwhisk/blob/master/docs/actions.md>



Action

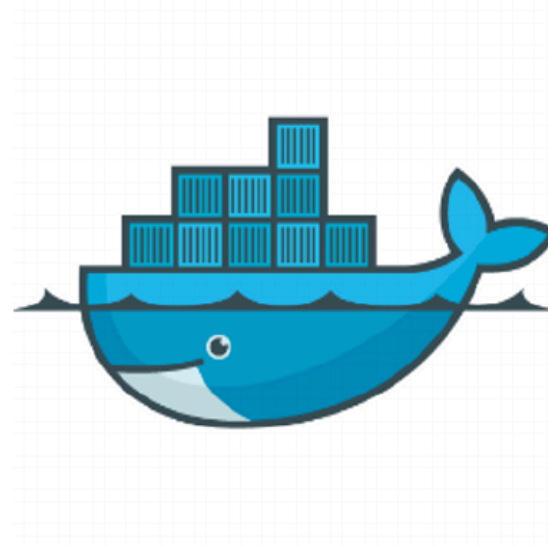
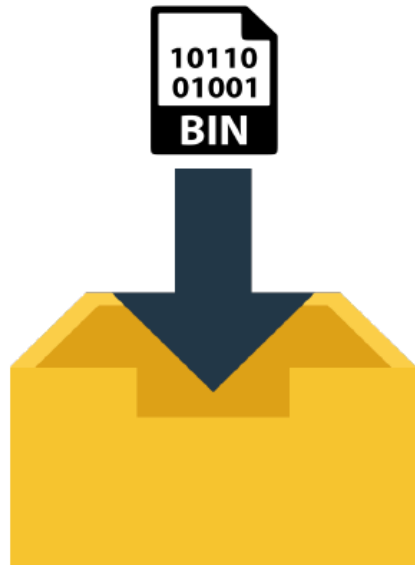
- A** Can be written in a variety of languages, such as JavaScript, Python, Java, and Swift

```
function main(params) {  
    return { message: 'Hello, ' + params.name + ' from ' + params.place };  
};
```



Action

- A Or any other language by packaging with Docker



```
wsk action create --docker ACTION_NAME DOCKER_IMAGE_NAME
```



Action

- A** Can be composed to create sequences that increase flexibility and foster reuse



`wsk action create my_seq --sequence ACTION_NAME1,ACTION_NAME2`



Common commands

- 列出当前已有的action

`wsk action list`

- 创建action

`wsk action create ACTION_NAME ACTION`

例: `wsk action create handler handler.js`

- 调用action

`wsk action invoke -r ACTION_NAME`

例: `wsk action invoke -r handler`

- 删除action

`wsk action delete ACTION_NAME`



Trigger

T *A class of events that can occur*



Social events

Data changes



Device readings

User input



Location updates



Common commands

- 列出已有的trigger

wsk trigger list

- 创建trigger

wsk trigger create TRIGGER_NAME [flags]

例: wsk trigger create my_event

- 触发trigger

wsk trigger fire TRIGGER_NAME [PAYLOAD] [flags]

例: wsk trigger fire my_event

- 删除trigger

wsk trigger delete TRIGGER_NAME



Rule

R *An association of a trigger to an action in a many to many mapping.*



Common commands

- 列出已有的rule

wsk rule list

- 创建rule

wsk rule create RULE_NAME TRIGGER_NAME ACTION_NAME [flags]

例: wsk rule create my_rule my_event handler

- 打开监控

wsk activation poll

- 触发trigger

wsk trigger fire my_event

例: wsk trigger fire my_event

- 查看结果

wsk activation result ACTIVATION_ID

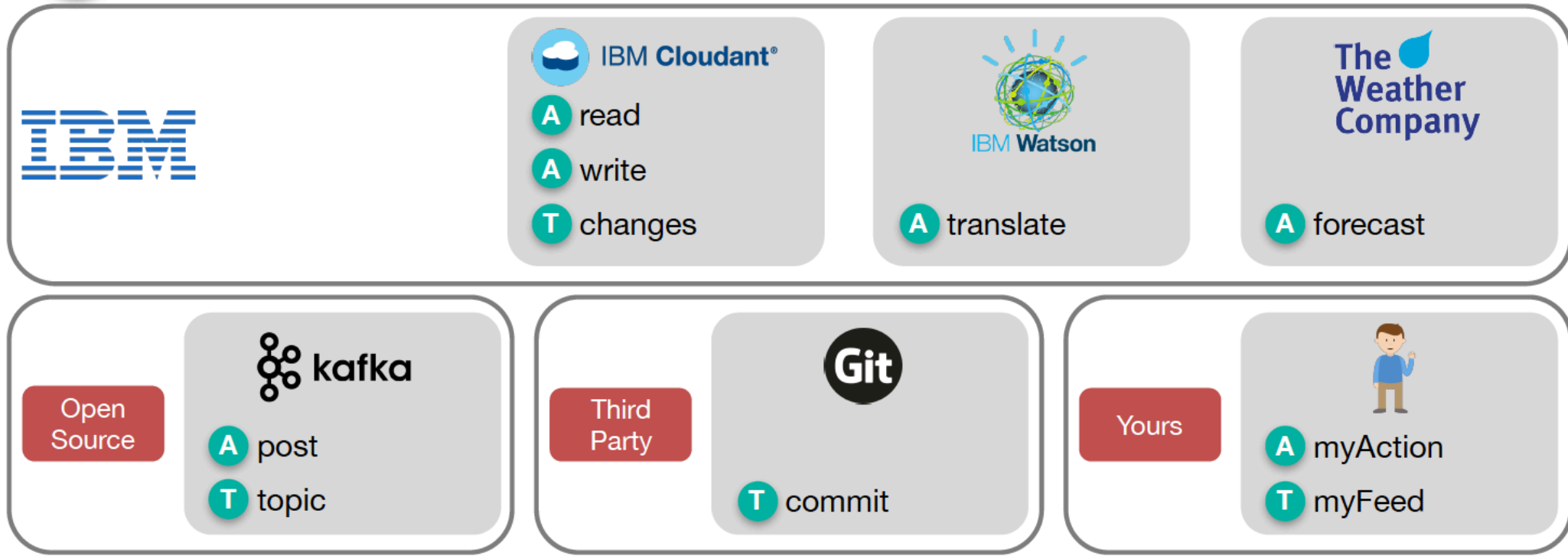
- 删除rule

wsk rule delete RULE_NAME



Package

P *A shared collection of triggers and actions*



<https://github.com/openwhisk/openwhisk/blob/master/docs/packages.md>



Common commands

- 列出已有的包

`wsk package list [NAMESPACE] [flags]`

列出缺省名字空间下面的包: `wsk package list`

列出系统名字空间下面的包: `wsk package list /whisk.system`

- 察看某一个包的内容

`wsk package get PACKAGE_NAME [FIELD_FILTER] [flags]`

例如: `wsk package get --summary /whisk.system/watson-textToSpeech`



Advanced OpenWhisk programming model

- Feed
- Web Action
- Gateway



Feed

F *an event producer service exposed by users in a package*



<https://github.com/openwhisk/openwhisk/blob/master/docs/feeds.md>



Common commands

- 察看系统包/whisk.system/alarm

```
wsk package get --summary /whisk.system/alarms
```

- 创建一个触发器

```
wsk trigger create every-20-seconds --feed /whisk.system/alarms/alarm --  
param cron "*/20 * * * *"
```

- 在另一个窗口中打开监控

```
wsk activation poll
```

- 设定规则

```
wsk rule create invoke-periodically every-20-seconds handler
```

- 禁用规则

```
wsk rule disable invoke-periodically
```



Web Action



An action which can be invoked using a URL without the need for credentials.



`https://{APIHOST}/api/v1/web/...`

`https://console.ng.bluemix.net/openwhisk/apimanagement`



API Gateway

The API Gateway acts as a proxy to Web Actions and provides them with additional features including HTTP method routing , client id/secrets, rate limiting, CORS, view API usage and response logs, and define API sharing policies.

https://console.ng.bluemix.net/docs/openwhisk/openwhisk_apigateway.html



Common commands

- 创建Web action

`wsk action create ACTION_NAME ACTION_SOURCE -web true`

- 创建API Gateway的一个项目

`wsk api create [BASE_PATH] API_PATH API_VERB ACTION`

- 列出所有API Gateway的所有项目

`wsk api list`

- 删除API Gateway的项目

`wsk api delete BASE_PATH API_PATH`

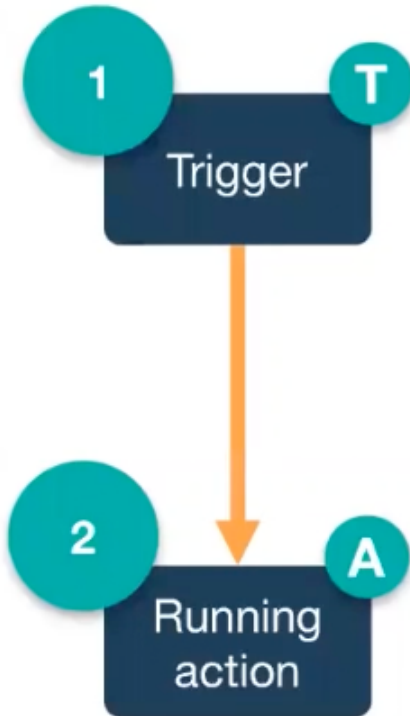


Demo

- Demo 1
 - Action, trigger, rule, feed
- Demo 2
 - Web action, API Gateway
- Demo 3
 - Slack integration
 - Package binding



Demo1



1. Cron syntax alarm

2. Log the current time

```
function main(params) {  
  var date = new Date();  
  var now = (date.getHours() + ":" +  
            date.getMinutes() + ":" +  
            date.getSeconds());  
  console.log("Invoked at: " + now);  
  return { message: "Invoked at: " + now };  
}
```

```
$ wsk action create handler handler.js
```

```
$ wsk action invoke --blocking handler
```

```
$ wsk trigger create every-20-seconds \  
  --feed /whisk.system/alarms/alarm \  
  --param cron "*/20 * * * *"
```

```
$ wsk rule create \  
  invoke-periodically \  
  every-20-seconds \  
  handler
```

```
$ wsk activation poll
```

github.com/krook/dw-openwhisk-demo-1

Demo 2



Web Action

```
$ wsk package create demo
$ wsk action create demo/hello hello.js --web true
$ curl https://openwhisk.ng.bluemix.net/api/v1/web/guoyingc@cn.ibm.com_daisyguo-space/demo/hello.http
```

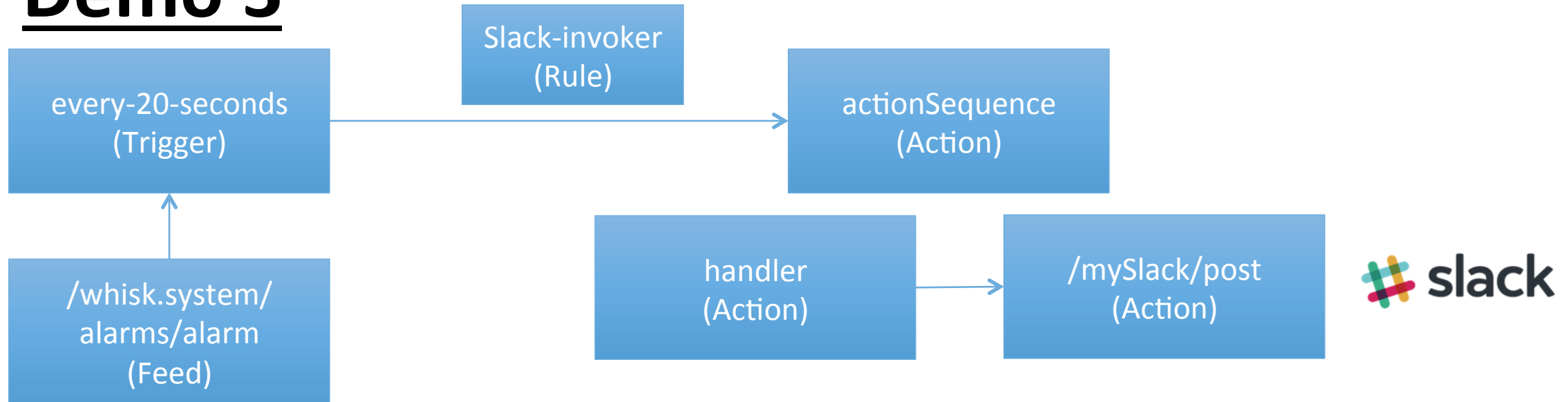


API Gateway

Web Action

```
$ wsk bluemix login --user <your email> --password <your password>
$ wsk api create /hello /world get /
guoyingc@cn.ibm.com_daisyguo-space/demo/hello --response-type json
$ curl https://service.us.apiconnect.ibmcloud.com/gws/apigateway/api/13e333c7ef2cf94893209dc64ebc7d295ef5/hello/world
```

Demo 3



```
$ wsk package bind /whisk.system/slack mySlack --param url "https://hooks.slack.com/services/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" --param username "Timer" --param channel "general"
$ wsk action invoke /guoyingc@cn.ibm.com_daisyguo-space/mySlack/post --result --param text "hello"
$ wsk action create sequenceAction --sequence /guoyingc@cn.ibm.com_daisyguo-space/handler,/
guoyingc@cn.ibm.com_daisyguo-space/mySlack/post
$ wsk action invoke -r sequenceAction
$ wsk rule create slack-invoker-timely every-20-seconds sequenceAction
```



Summary

- Set up your own OpenWhisk environment
- Basic OpenWhisk programming model
- Advanced OpenWhisk programming model





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