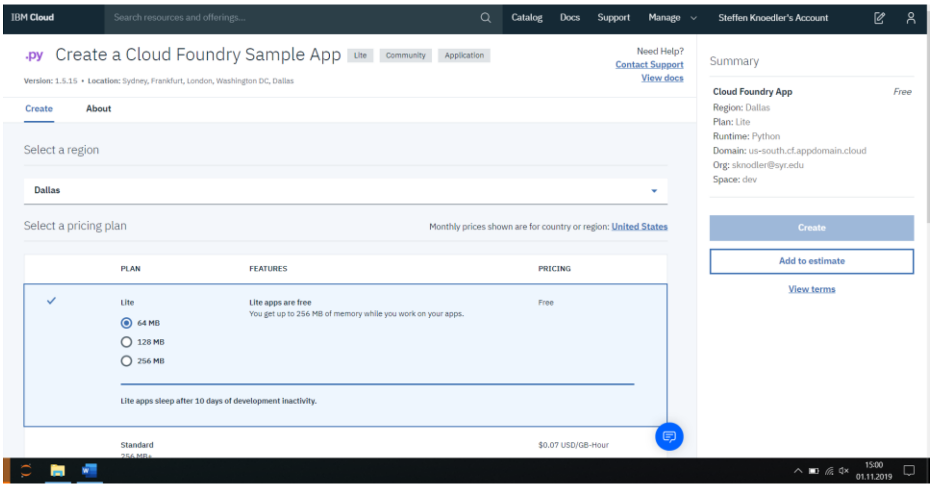
MODULE 1 - IBM Cloud Foundry Sub-Module

1.1 - Create a Cloud Foundry Sample App

- Go to the link https://cloud.ibm.com/catalog
    - Scroll down to 'Offering type' and select the check box 'Cloud Foundry apps'
    - Once you click on Cloud Foundry apps you will be directed to the link below https://cloud.ibm.com/cloudfoundry/overview?bss_account=8ef236e9888f4172a9041 0d25 31322ea
    - Scroll down to "Application Runtimes' and select one of the language runtimes
    - For instance, if you select '.py' you will be redirected the sample app creation link https://cloud.ibm.com/catalog/starters/cloud-foundry?runtime=liberty-for-java



.py Create a Cloud Foundry Sample App Lite Community Application

Version: 1.5.15 • Location: Sydney, Frankfurt, London, Washington DC, Dallas

Select a region

Dallas

Select a pricing plan

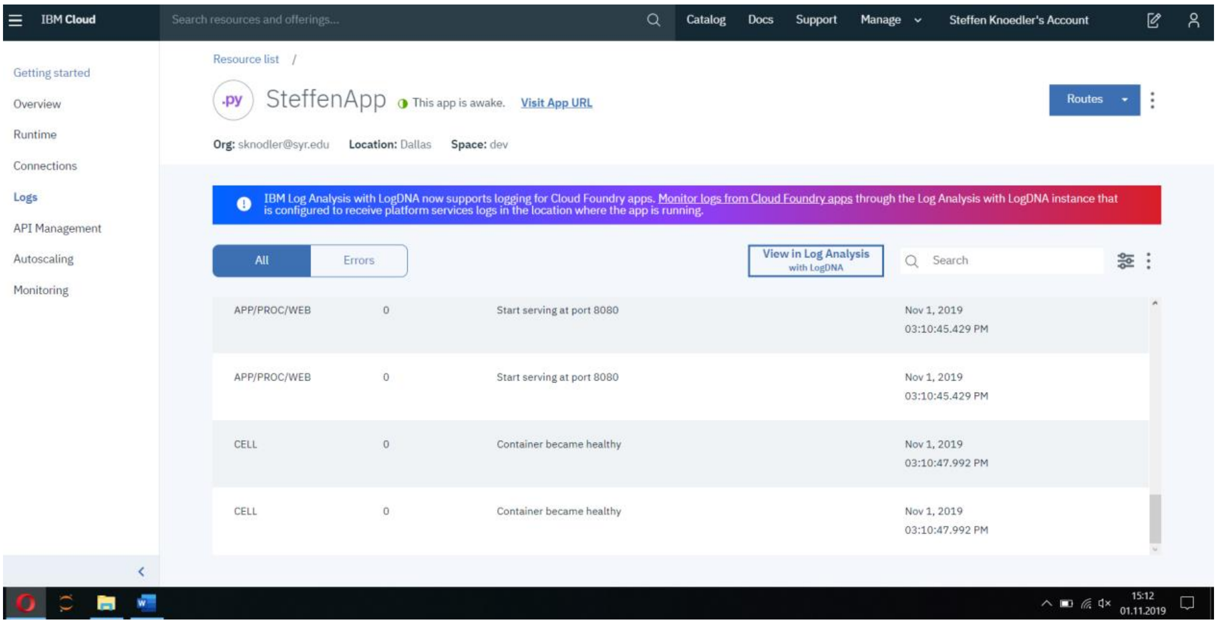
Monthly prices shown are for country or region: United States

	PLAN	FEATURES	PRICING
✓	Lite ● 64 MB ○ 128 MB ○ 256 MB	Lite apps are free You get up to 256 MB of memory while you work on your apps.	Free
	Lite apps sleep after 10 days of development inactivity.		
	Standard 256 MB+		$0.07 USD/GB-Hour

Summary

Cloud Foundry App *Free*
Region: Dallas
Plan: Lite
Runtime: Python
Domain: us-south.cf.appdomain.cloud
Org: sknodler@syr.edu
Space: dev

-
    - Under 'Create' tab select
        - Region - Dallas (for instance)
        - Pricing Plan - Lite 64 MB
        - Runtime - Python
        - App Name - Enter a unique name
        - Host Name - auto populated, will be the same as App Name
        - Domain - mybluemix.net
        - Organization - auto populated, will be the same as your email id
        - Space - dev
        - Tags - optional
    - Once you click on 'Create' you will directed to Resource List
    - Click 'Logs' in the left navigation to watch the messages as the app builds and is started
        - Watch for a message confirming that the application has started: CELL/0 Container became healthy



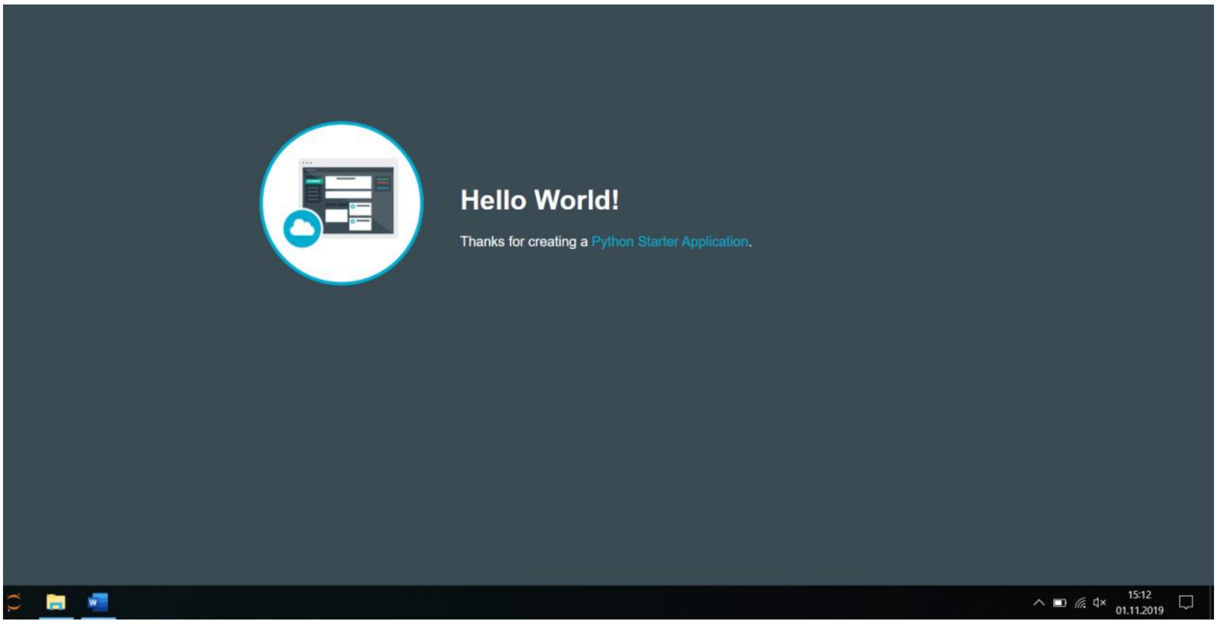
SteffenApp This app is awake. Visit App URL

Org: sknodler@syr.edu Location: Dallas Space: dev

IBM Log Analysis with LogDNA now supports logging for Cloud Foundry apps. Monitor logs from Cloud Foundry apps through the Log Analysis with LogDNA instance that is configured to receive platform services logs in the location where the app is running.

```
APP/PROC/WEB    0    Start serving at port 8080    Nov 1, 2019
                                                   03:10:45.429 PM
APP/PROC/WEB    0    Start serving at port 8080    Nov 1, 2019
                                                   03:10:45.429 PM
CELL            0    Container became healthy      Nov 1, 2019
                                                   03:10:47.992 PM
CELL            0    Container became healthy      Nov 1, 2019
                                                   03:10:47.992 PM
```

- Click ‘Routes’ and then select the link to your application URL. Alternatively, you can click on ‘Visit App URL’
- Your application will be launched in a separate tab



Hello World!

Thanks for creating a Python Starter Application.

Cloud Foundry is an open-source PaaS that can be used to deploy as well as scale applications without managing any servers. It takes advantage of a container-based architecture that can run applications in any language. I have used cloud foundry to create and host a python web application.

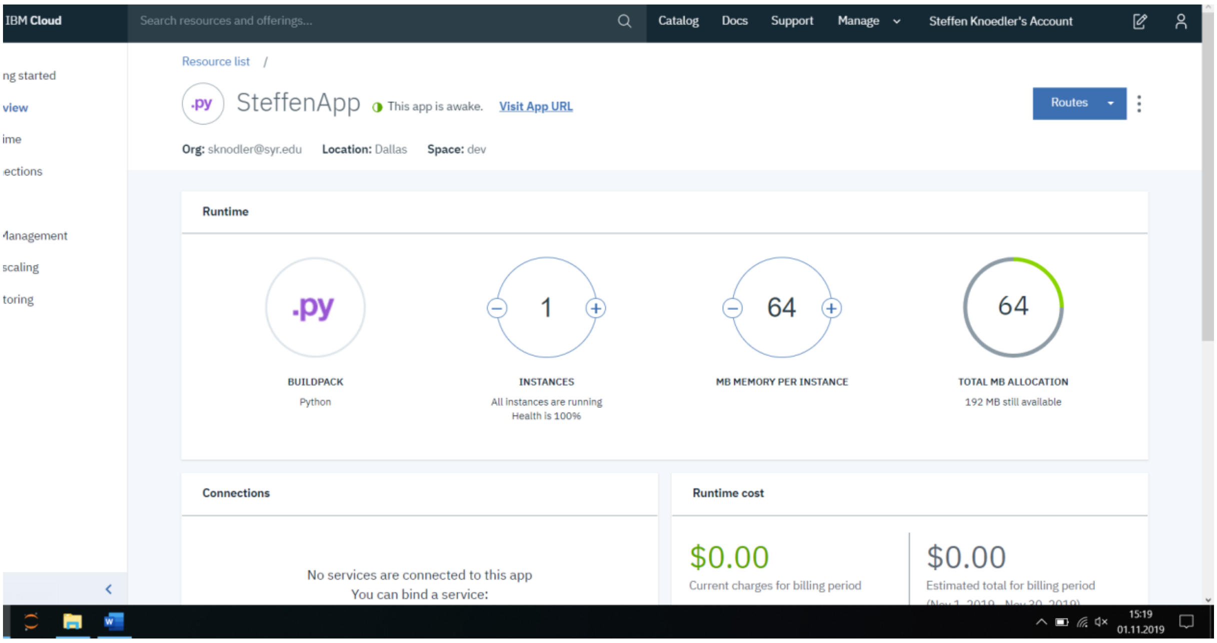
Sub-Module 1.1 - Questions

1. **What is Cloud Foundry? Describe in brief the high-level Cloud Foundry architecture on IBM Cloud.**

Cloud Foundry is an open-source PaaS that can be used to deploy as well as scale applications without managing any servers. It takes advantage of a container-based architecture that can run applications in any language. The PaaS includes a self-service application-engine to run the application, an automation engine that makes deployment and maintenance possible, a command line to interact with the environment as well as integration of development tools. The architecture follows an open approach, which allows the user to add frameworks and build whatever supplication without worrying about the cloud infrastructure. When using cloud foundry on IBM cloud, the user can use automatic health management service that can restart the application when necessary, automatic routing that automaticcal creazed internet reachable routes for the application, automatic placement that places the app automatically across data centers as well as access control that allows the user to assign certain access to certain people.

2. **What is Loggregator? Briefly describe the type of logs shown in the Logs dashboard of resource list.**
   Loggreator by IBM collects logs as well as metrics from my app to display them at one place.
   - STG: This component provides information on how the application is staged
   - API: This type shows information about internal actions that come from a request to change the state of the app
   - CELL: This type provides information about start, stop and crash of the application
   - APP: This type includes logs from the application
   - RTR: It provides information about HTTP requests to the app.

3. **How many instances were created for this app? Attach a relevant snapshot.**
   One Instances was created for this app.



This app is awake.

Org: sknodler@syr.edu Location: Dallas Space: dev

All instances are running
Health is 100%

192 MB still available

No services are connected to this app
You can bind a service:

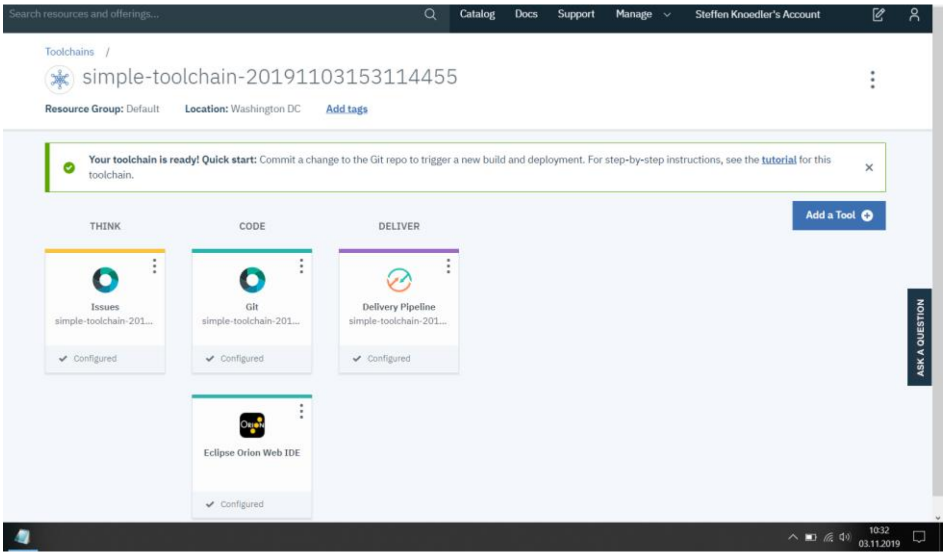
$0.00
Current charges for billing period

$0.00
Estimated total for billing period

Sub-Module 1.2 - Develop a Cloud Foundry App using Toolchains

- Go to the course ‘Introduce toolchains by using the "Develop a Cloud Foundry app" toolchain’ https://www.ibm.com/cloud/garage/tutorials/introduce-develop-cloud-foundry-app-toolchain?tas k=4

- Log in to your garage-profile-blue by clicking on ‘Login’ option on top right corner
- Scroll down and conform with the specified ‘Prerequisites’ before you start with Tasks
- Task 1: Create a toolchain
    - NOTE: Save the value of API key for later use. To modify the code, you can change any .html part of the code.



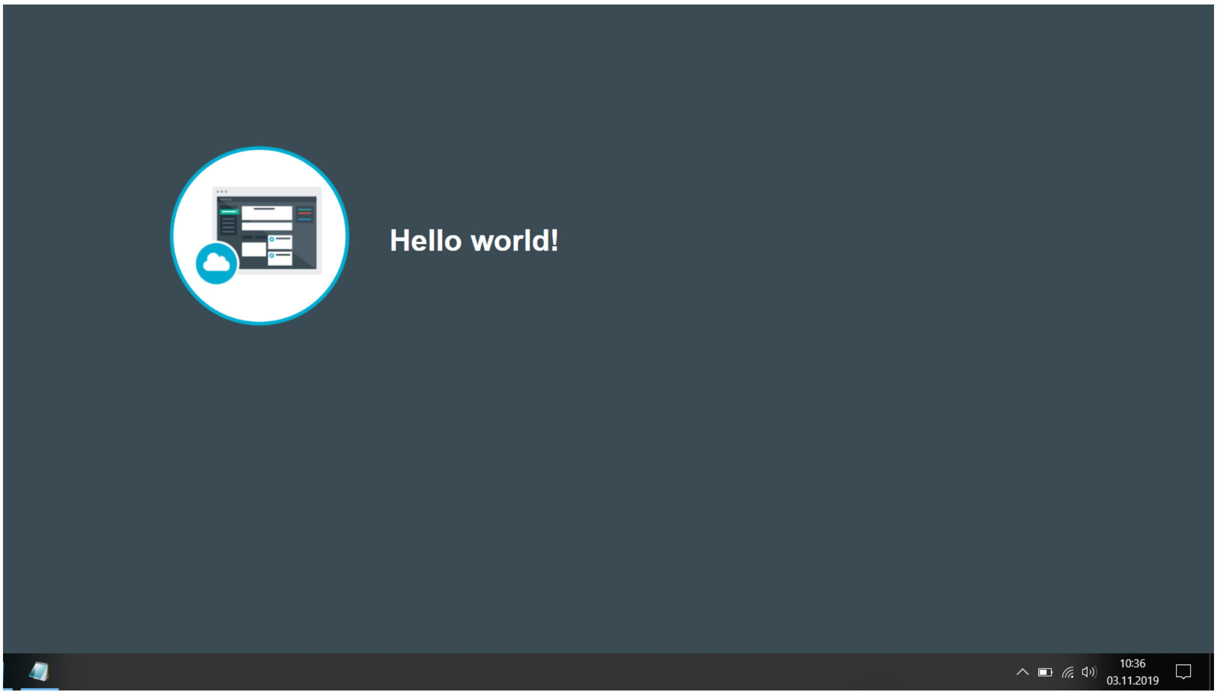
Toolchains /

simple-toolchain-20191103153114455

Resource Group: Default Location: Washington DC Add tags

Your toolchain is ready! Quick start: Commit a change to the Git repo to trigger a new build and deployment. For step-by-step instructions, see the tutorial for this toolchain.

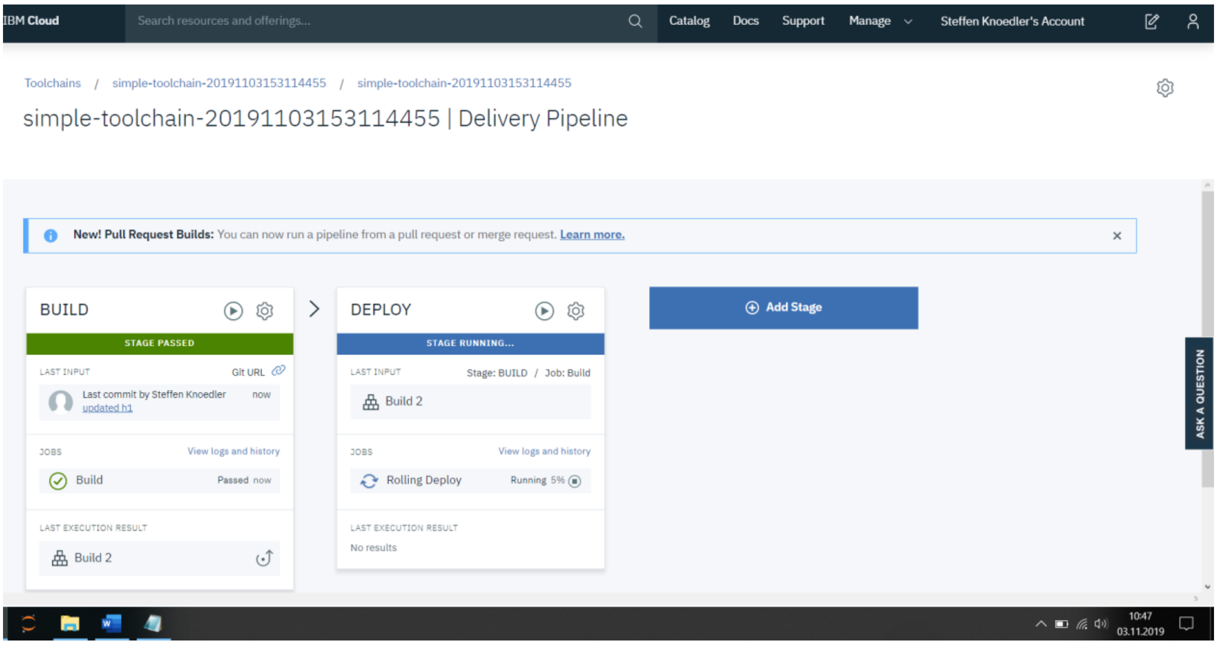
THINK	CODE	DELIVER
Issues simple-toolchain-201... ✓ Configured	Git simple-toolchain-201... ✓ Configured	Delivery Pipeline simple-toolchain-201... ✓ Configured
	Eclipse Orion Web IDE ✓ Configured	

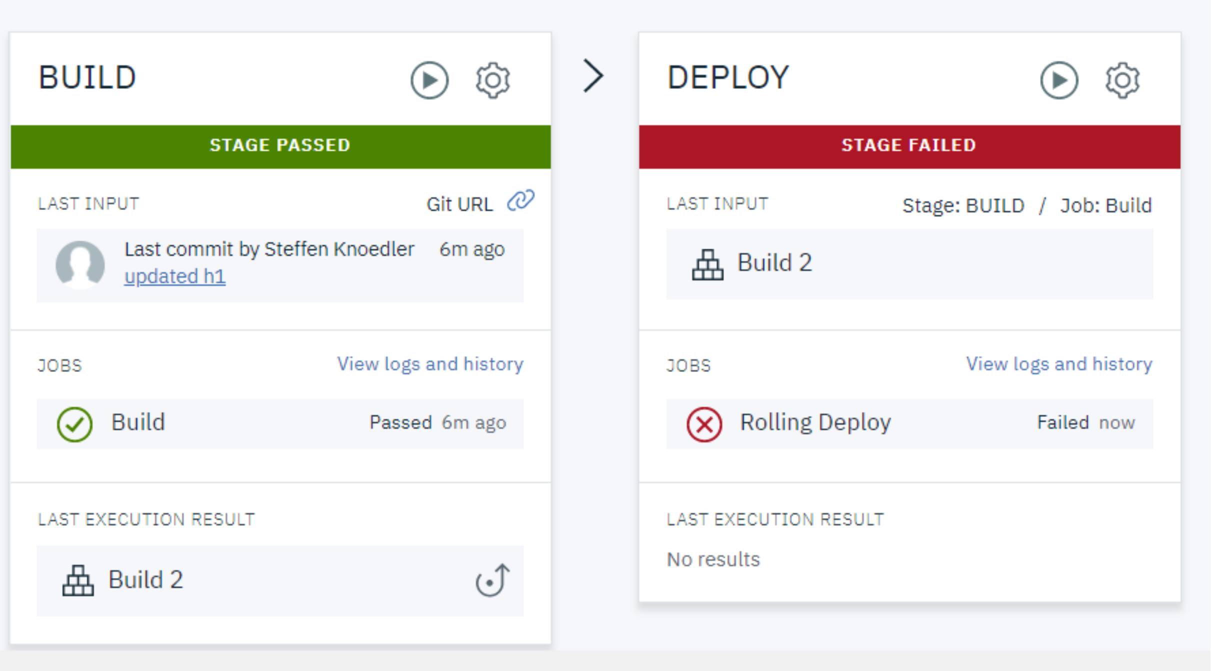


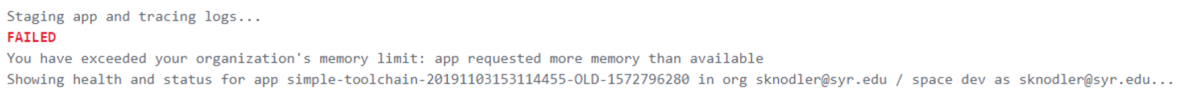
Hello world!

I have created a toolchain and hosted a web app on basis of a template. Toolchain is a collection of tools that can help me to develop, deploy as well as operate tasks – needed for my software to run. In this example, I have used a template that already contains a set of tool integrations and code that can be used to deploy a cloud foundry app. It includes services for continuous delivery, source control, issue tracking as well as online editing.

- Task 2: Modify the code


IBM Cloud
Search resources and offerings...
Catalog
Docs
Support
Manage
Steffen Knoedler's Account
Toolchains / simple-toolchain-20191103153114455 / simple-toolchain-20191103153114455
simple-toolchain-20191103153114455 | Delivery Pipeline
New! Pull Request Builds: You can now run a pipeline from a pull request or merge request. Learn more.
BUILD
STAGE PASSED
LAST INPUT
Git URL
Last commit by Steffen Knoedler now
updated h1
JOBS
View logs and history
Build
Passed now
LAST EXECUTION RESULT
Build 2
DEPLOY
STAGE RUNNING...
LAST INPUT
Stage: BUILD / Job: Build
Build 2
JOBS
View logs and history
Rolling Deploy
Running 5%
LAST EXECUTION RESULT
No results
Add Stage
ASK A QUESTION
10:47
03.11.2019

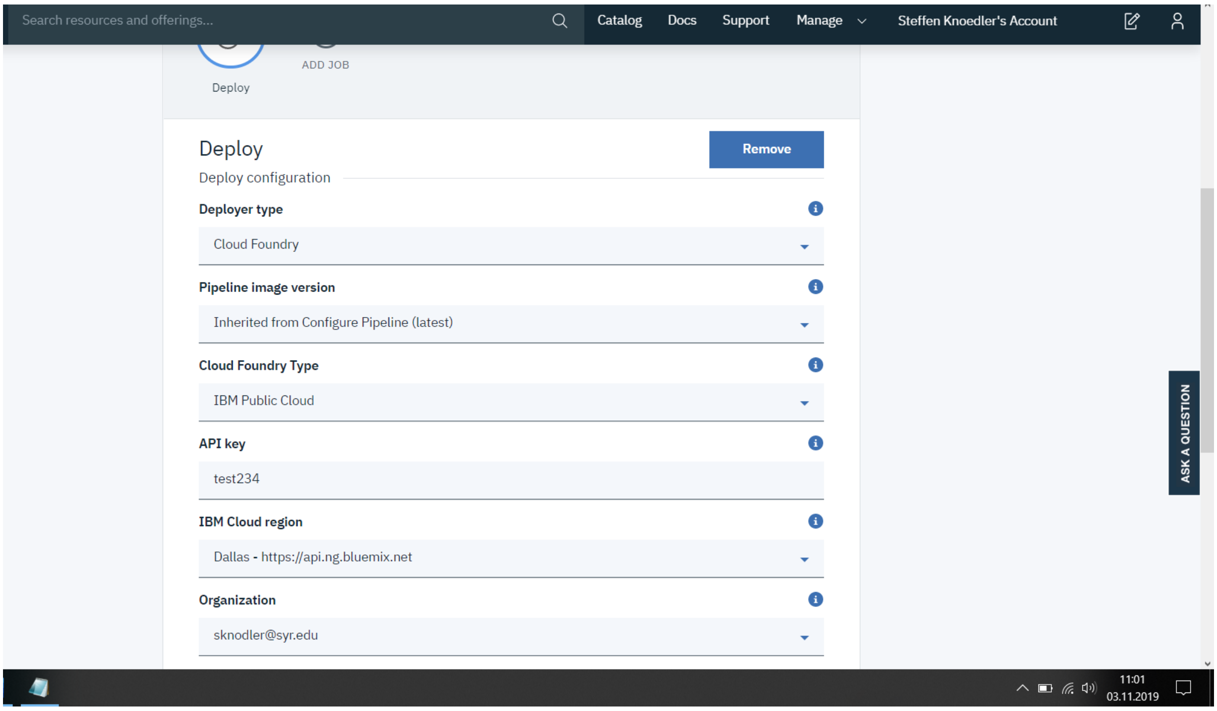




```
Staging app and tracing logs...
FAILED
You have exceeded your organization's memory limit: app requested more memory than available
Showing health and status for app simple-toolchain-20191103153114455-OLD-1572796280 in org sknodler@syr.edu / space dev as sknodler@syr.edu...
```

I went into the html source code of the website and updated the welcome text. I successfully committed and pushed my changed but I could not deploy it because I ran out of memory. Please see error log. This is not my mistake.

- Task 3: Add a stage to the pipeline



Deploy

Deploy configuration

Deployer type: Cloud Foundry

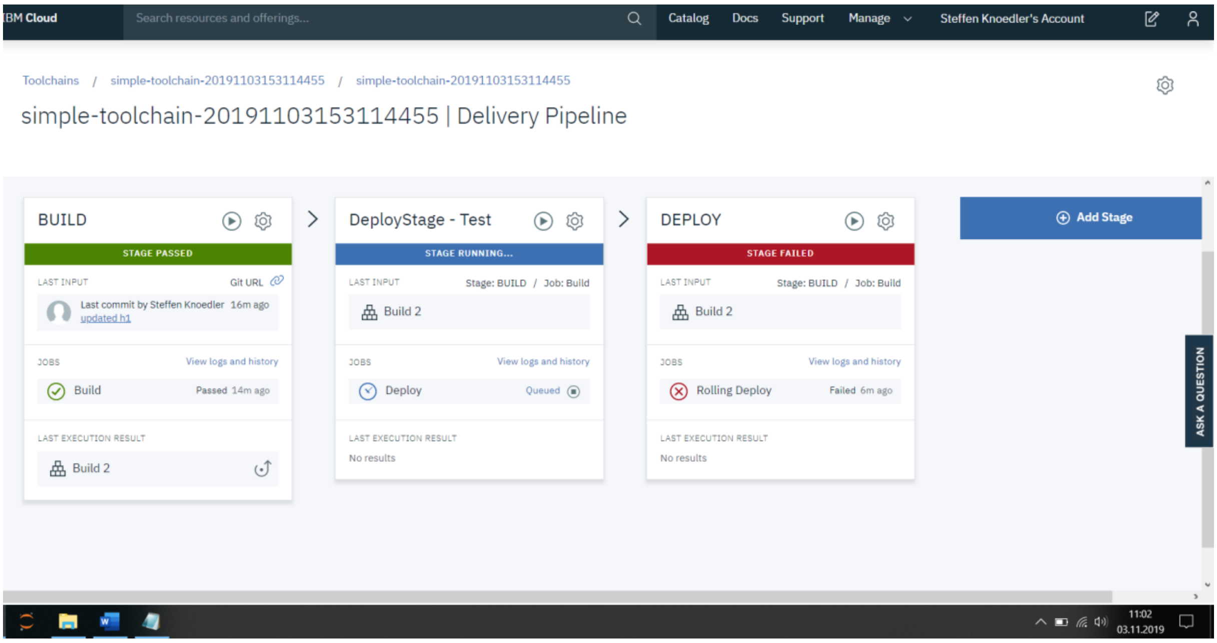
Pipeline image version: Inherited from Configure Pipeline (latest)

Cloud Foundry Type: IBM Public Cloud

API key: test234

IBM Cloud region: Dallas - https://api.ng.bluemix.net

Organization: sknodler@syr.edu



IBM Cloud
Search resources and offerings...
Catalog
Docs
Support
Manage
Steffen Knoedler's Account
Toolchains / simple-toolchain-20191103153114455 / simple-toolchain-20191103153114455
Add Stage
ASK A QUESTION
11:02
03.11.2019

simple-toolchain-20191103153114455 | Delivery Pipeline

BUILD — STAGE PASSED
LAST INPUT — Git URL
Last commit by Steffen Knoedler 16m ago
updated h1
JOBS — View logs and history
Build — Passed 14m ago
LAST EXECUTION RESULT
Build 2

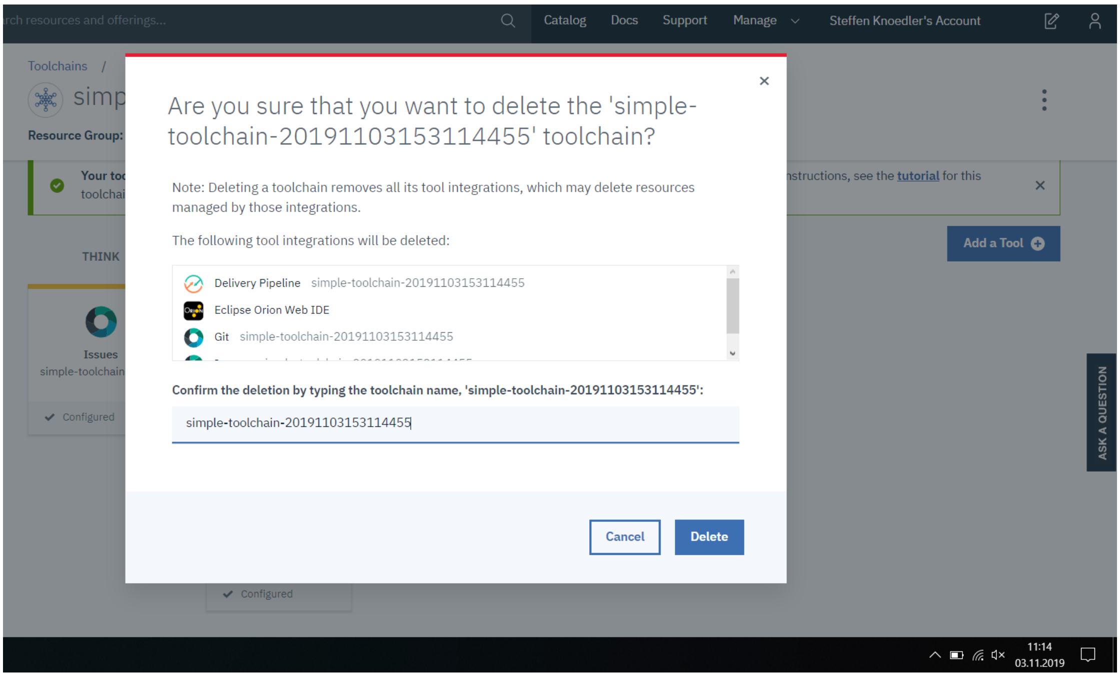
DeployStage - Test — STAGE RUNNING...
LAST INPUT — Stage: BUILD / Job: Build
Build 2
JOBS — View logs and history
Deploy — Queued
LAST EXECUTION RESULT
No results

DEPLOY — STAGE FAILED
LAST INPUT — Stage: BUILD / Job: Build
Build 2
JOBS — View logs and history
Rolling Deploy — Failed 6m ago
LAST EXECUTION RESULT
No results

The Build stage gets the source code from my repository. It compiles or processes the code to produce the IT artifact for deployment. In the next stage, I can deploy the IT artifact. However, in this task I have added a test deploy stage to see if an employment would succeed. This way I can prevent issues in the production environment.

The Deploy stage contains jobs that deploy the artifacts created by the Build stage.

- Task 4: Delete the toolchain (Optional)



Are you sure that you want to delete the 'simple-toolchain-20191103153114455' toolchain?

Note: Deleting a toolchain removes all its tool integrations, which may delete resources managed by those integrations.

The following tool integrations will be deleted:

Delivery Pipeline simple-toolchain-20191103153114455

Eclipse Orion Web IDE

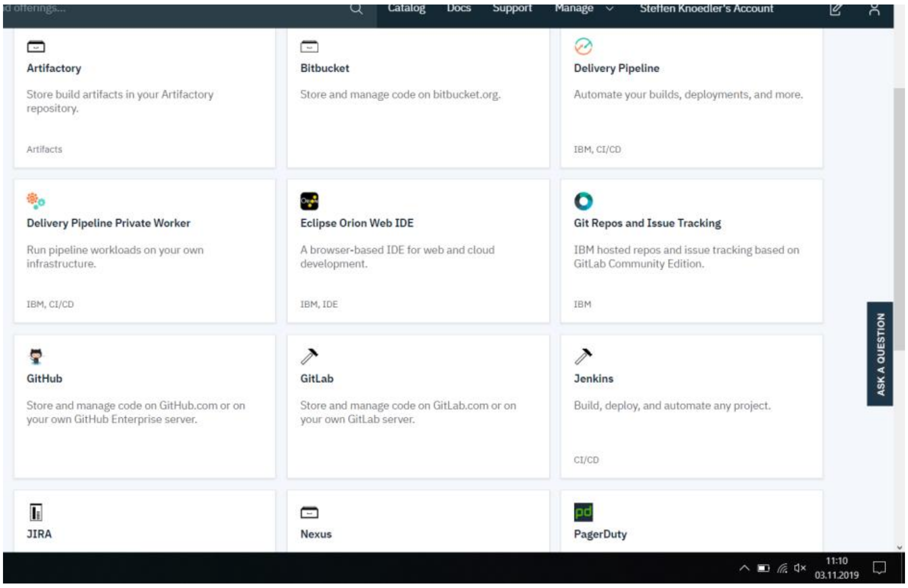
Git simple-toolchain-20191103153114455

Confirm the deletion by typing the toolchain name, 'simple-toolchain-20191103153114455':

simple-toolchain-20191103153114455

Sub-Module 1.2 - Questions

1. Which tool integrations are available to add and configure for your toolchain?



Artifactory
Store build artifacts in your Artifactory repository.
Artifacts

Bitbucket
Store and manage code on bitbucket.org.

Delivery Pipeline
Automate your builds, deployments, and more.
IBM, CI/CD

Delivery Pipeline Private Worker
Run pipeline workloads on your own infrastructure.
IBM, CI/CD

Eclipse Orion Web IDE
A browser-based IDE for web and cloud development.
IBM, IDE

Git Repos and Issue Tracking
IBM hosted repos and issue tracking based on GitLab Community Edition.
IBM

GitHub
Store and manage code on GitHub.com or on your own GitHub Enterprise server.

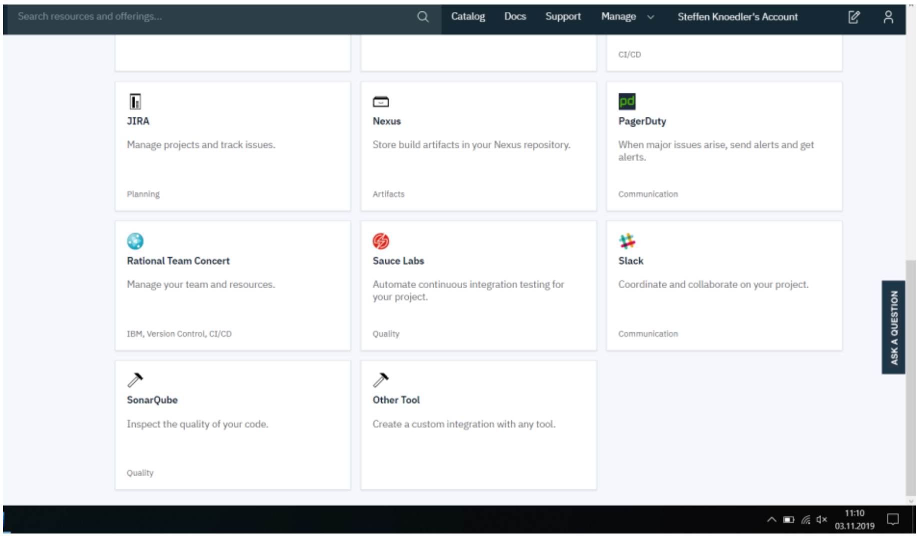
GitLab
Store and manage code on GitLab.com or on your own GitLab server.

Jenkins
Build, deploy, and automate any project.
CI/CD

JIRA

Nexus

PagerDuty



CI/CD

JIRA
Manage projects and track issues.
Planning

Nexus
Store build artifacts in your Nexus repository.
Artifacts

PagerDuty
When major issues arise, send alerts and get alerts.
Communication

Rational Team Concert
Manage your team and resources.
IBM, Version Control, CI/CD

Sauce Labs
Automate continuous integration testing for your project.
Quality

Slack
Coordinate and collaborate on your project.
Communication

SonarQube
Inspect the quality of your code.
Quality

Other Tool
Create a custom integration with any tool.

2. What is Continuous delivery (CD)?
   I use an automated pipeline to always have my application ready to be used and still be able to continuously work and update the software.
   a. What is a delivery pipeline?
      A delivery pipeline is the sequence of build-test-deploy. The delivery pipelines enables me to easily update and maintain my application whenever needed.
   b. List down at least four benefits of an automated software delivery pipeline.
      1. I can integrate automated testing to verify that my software will work in production environment and other parts are also still working when deployed.
      2. Automated recovery can be integrated in case something goes wrong
      3. I can automatically trigger a test of my software after a successful build. This saves time
      4. New team members can begin to work much faster because they do not need to learn complex development and test environments.

   c. What is DevOps and what part does it play in the Method?

      DevOps is an approach to agile and lean software delivery that should bring together the different business departments, IT, development and business. It aims to improves software delivery and includes continuous delivery, deployment and monitoring. Therefore, continuous delivery is a part of the DevOps approach.

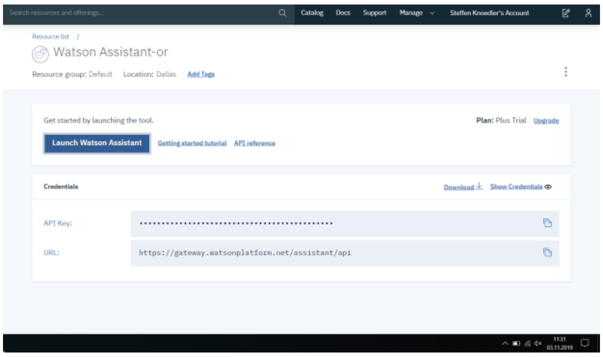
MODULE 2 - IBM Watson

Sub-Module 2.1 - Building a virtual assistant/chatbot

- Go to the tutorial link for creating IBM Watson Assistant https://cloud.ibm.com/docs/services/assistant?topic=assistant-getting-started#getting-started
  - NOTE: You can create the virtual assistant for any application
- Create a service instance to start

- Go to the Watson Assistant page in the IBM Cloud™ catalog and Select https://cloud.ibm.com/catalog/services/watson-assistant
  - Region - Dallas
  - Pricing Plan - Plus Trial
  - Service Name - set by default
  - Resource Group - Default
  - Tags - optional

- Step 1: Open Watson Assistant



Watson Assistant-or

Resource group: Default   Location: Dallas   Add Tags

Get started by launching the tool.

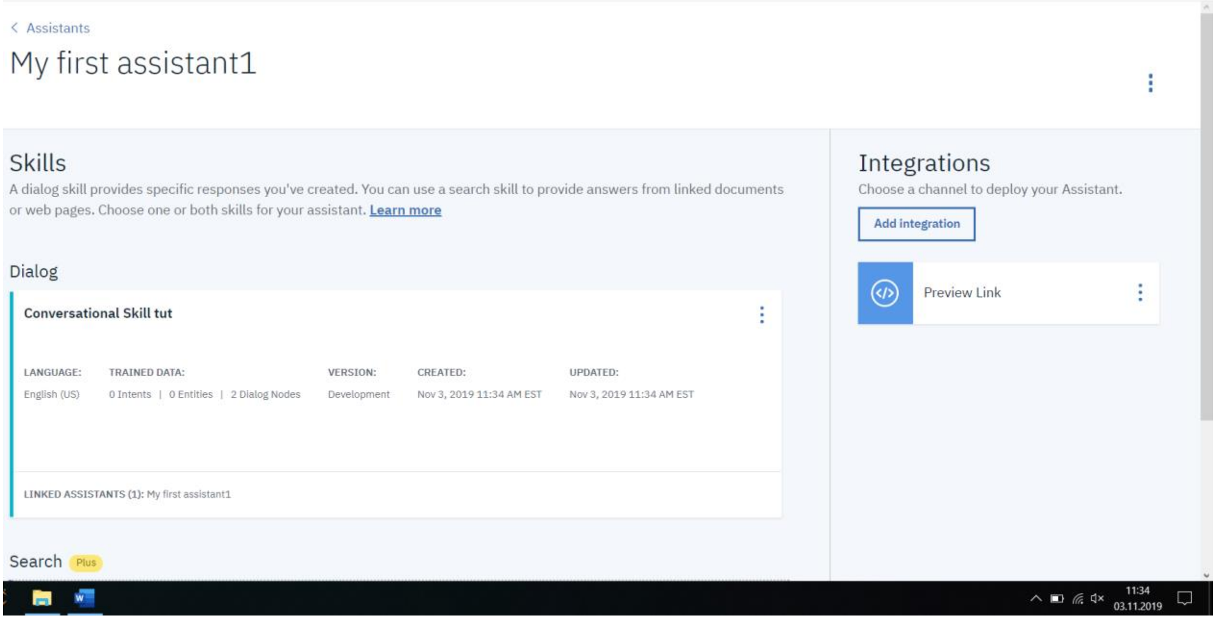
Plan: Plus Trial

Credentials

API Key: ••

URL: https://gateway.watsonplatform.net/assistant/api

- Step 2: Create an assistant
- Step 3: Create a dialog skill



My first assistant1

Skills

A dialog skill provides specific responses you've created. You can use a search skill to provide answers from linked documents or web pages. Choose one or both skills for your assistant. Learn more

Dialog

Conversational Skill tut

LANGUAGE:	TRAINED DATA:	VERSION:	CREATED:	UPDATED:
English (US)	0 Intents | 0 Entities | 2 Dialog Nodes	Development	Nov 3, 2019 11:34 AM EST	Nov 3, 2019 11:34 AM EST

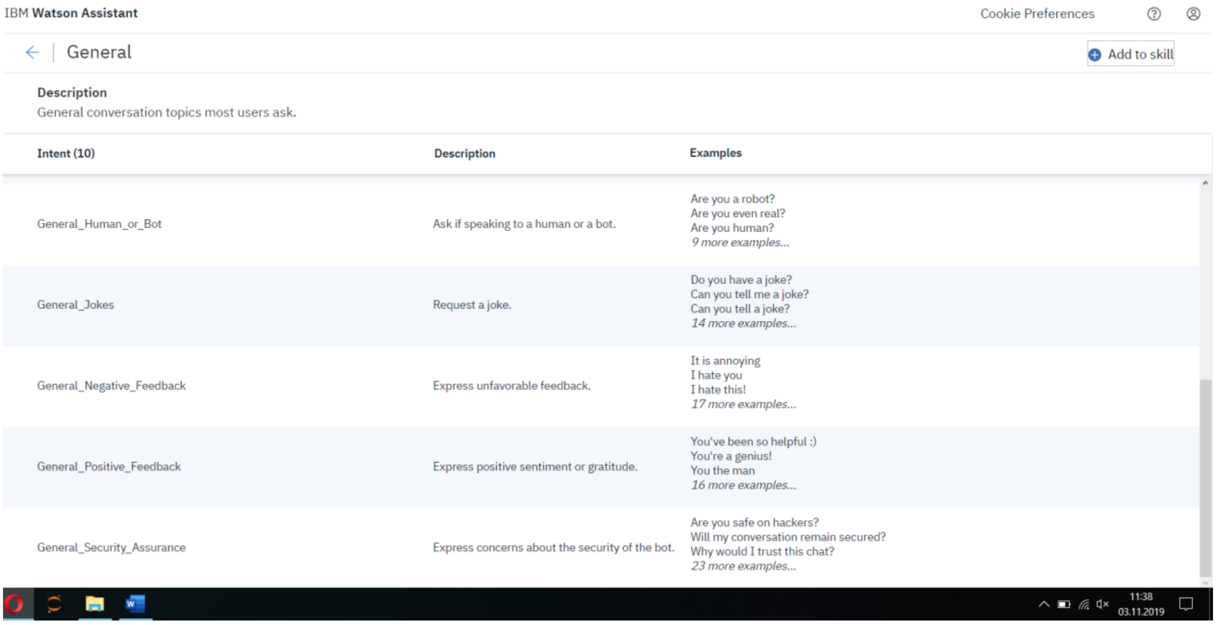
LINKED ASSISTANTS (1): My first assistant1

Search

Integrations

Choose a channel to deploy your Assistant.

- Step 4: Add intents from a content catalog



IBM **Watson Assistant**

Cookie Preferences

General

Add to skill

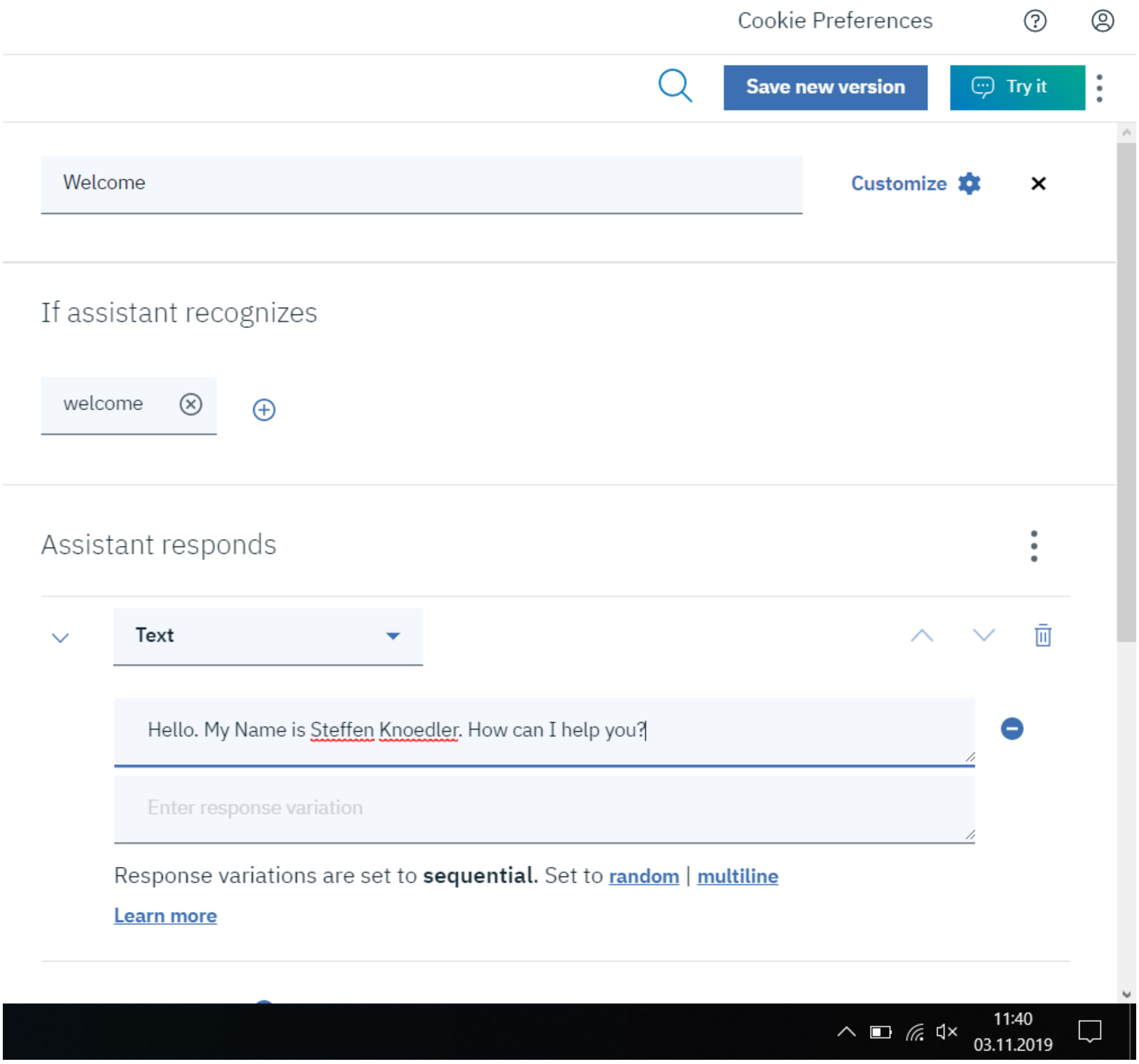
Description

General conversation topics most users ask.

Intent (10)	Description	Examples
General_Human_or_Bot	Ask if speaking to a human or a bot.	Are you a robot? Are you even real? Are you human? *9 more examples...*
General_Jokes	Request a joke.	Do you have a joke? Can you tell me a joke? Can you tell a joke? *14 more examples...*
General_Negative_Feedback	Express unfavorable feedback.	It is annoying I hate you I hate this! *17 more examples...*
General_Positive_Feedback	Express positive sentiment or gratitude.	You've been so helpful :) You're a genius! You the man *16 more examples...*
General_Security_Assurance	Express concerns about the security of the bot.	Are you safe on hackers? Will my conversation remain secured? Why would I trust this chat? *23 more examples...*

11:38 03.11.2019

- Step 5: Build a dialog



Cookie Preferences

Save new version

Try it

Welcome

Customize

If assistant recognizes

welcome

Assistant responds

Text

Hello. My Name is Steffen Knoedler. How can I help you?

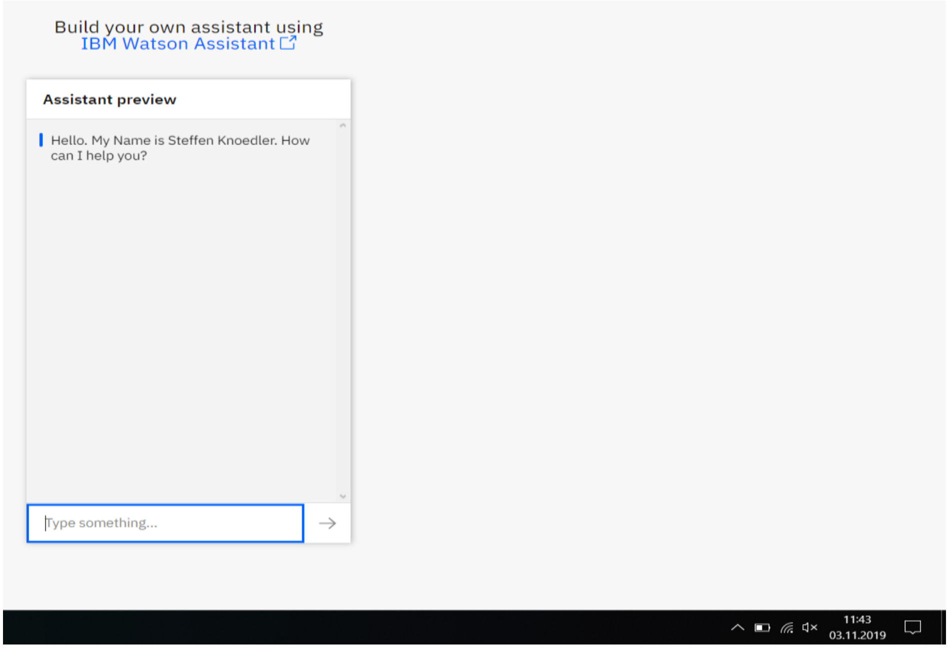
Enter response variation

Response variations are set to **sequential.** Set to random | multiline

Learn more

11:40 03.11.2019

- Step 6: Integrate the assistant



Build your own assistant using IBM Watson Assistant

Assistant preview

Hello. My Name is Steffen Knoedler. How can I help you?

Sub-Module 2.1 - Questions

1. What is an Assistant?

An assistant is a software product that is can conversationally interact with an user

2. Define Skills.

a. What are the two skill types?

Dialog Skill (skill to enable Watson to have a conversation and interact with the user)

Search Skill (Watson can use the input of the users as search queries and find external data sources

b. Describe the three types of artifacts wrt Dialog skills.

Intents, Entities, and Dialog: Intent is the intent of the users input. Entities represent an object or a term that is relevant to my intents – it provides the context for an intent. There, I can list possible values for each entity that the user might enter. The dialog is the flow that defines the responses to the defined intents and entities.

2. What is DevOps and what part does it play in the Method?
   DevOps is an approach to agile and lean software delivery that should bring together the different business departments, IT, development and business. It aims to improves software delivery and includes continuous delivery, deployment and monitoring Watson can help to monitor the software by receiving users feedback.