INTELLIGENCE AS A SERVICE. SELF-MANAGEMENT OF SERVICES
Intelligent infrastructure design for the IoT (DII)
(Second Part)
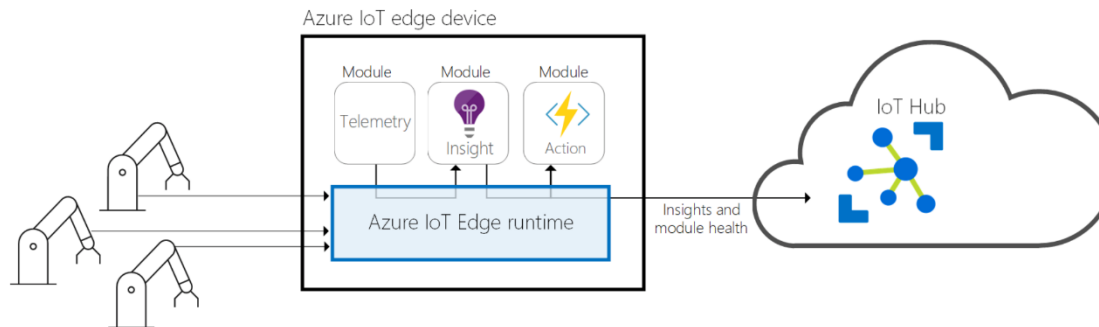
UNIVERSIDAD
COMPLUTENSE
MADRID

▶ Alfonso González Briones

▶ Based on material created by Jorge Gómez Sanz

Introduction SaaS and Serverless

▶ **PaaS for IoT**

  ▶ Azure + IoT Edge: adds Edge computing capabilities. Allows code to be deployed to run there.

  ▶ Azure Digital Twins, manage digital twins, https://www.youtube.com/watch?v=AtYEpvnEpp0

  ▶ Others

    ▶ Apache kafka, real time data processing. https://kafka.apache.org

    ▶ Apache spark, off-line data processing. https://spark.apache.org/

Introduction SaaS and Serverless

▶ **Introduction to SaaS**

    ▶ SaaS or Software as a Service is another cloud paradigm where the idea is that the software you need is not on your premises.

    ▶ You rely on others to maintain this software and become a remote customer.

    ▶ Much like the old business model of the 70's before PC's.

    ▶ Gartner - https://gcom.pdodev.aws.gartner.com/en/newsroom

        ▶ [2012] - "Gartner says organizations are more likely to use SaaS for sensitive data than for mission-critical data."

        ▶ [2014] - "Gartner survey reveals SaaS deployments are now mission critical."

    ▶ Cost reduction... yes; operational agility... also

Introduction SaaS and Serverless

▶ **What about IoT?**

   ▶ **Azure**: + IoT Central, connect and manage your IoT devices, https://docs.microsoft.com/en-us/azure/iot-central/ + IoT Hub, communication hub for IoT, https://azure.microsoft.com/en-us/services/iot-hub/

   ▶ **IBM**: + Internet of Things Platform, https://console.bluemix.net/catalog/services/internet-of-things-platform + AT&T Flow Designer, design IoT solutions with graphics + Bosch IoT Rollouts, update device firmware + Car diagnostic API, to read and interpret OBD codes + Precision location, using WIFI, gps, cellular or hybrid location + Unification Engine, an IoT messaging platform covering SMS, email, whatsapp to connect human and devices using NLP

   ▶ **OpenSource + thingsboard:** https://thingsboard.io/; https://github.com/thingsboard + FIWARE: https://www.fiware.org/successstories/smartappcity; https://github.com/Fiware + AEROGEAR: https://aerogear.org/

   ▶ Not so open source + OneSignal: https://onesignal.com/; https://github.com/OneSignal/ + Circuit: https://www.circuito.io + Makecode: https://makecode.adafruit.com/; https://www.microsoft.com/en-us/makecode

Introduction PaaS and IaaS

▶ **You have already used a cloud service that consists of creating a Virtual Machine in Azure. Exercise:**

  ▶ Start the Azure virtual machine

  ▶ Open a console

 ▶ The "last reboot" command indicates how long the server has been running.


```
maestro@ejerciciogrpc:~$ last reboot
reboot   system boot  4.15.0-1032-azur Mon Dec  3 16:00    still running
reboot   system boot  4.15.0-1032-azur Mon Dec  3 15:43 - 15:52  (00:09)
reboot   system boot  4.15.0-1032-azur Mon Nov 26 15:28 - 21:00  (05:31)
reboot   system boot  4.15.0-1032-azur Fri Nov 23 23:13 - 23:29  (00:16)
reboot   system boot  4.15.0-1030-azur Fri Nov 23 22:54 - 23:12  (00:17)
reboot   system boot  4.15.0-1030-azur Wed Nov 21 14:20 - 15:45  (01:25)

wtmp begins Wed Nov 21 14:20:30 2018
```

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► Then go to https://www.microsoftazuresponsorships.com and choose "check your ballance".
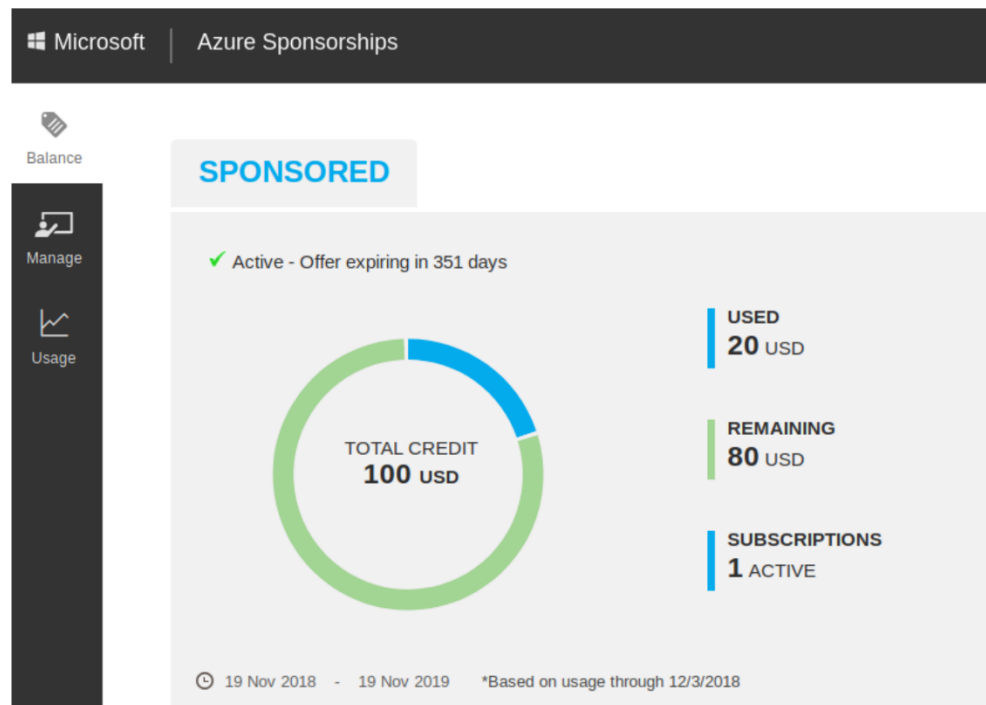
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▶ Within the same site, go to "usage" on the left and download the usage statistics.

Azure para estudiantes	01/12/18	Storage	Standard HDD Managed Disks	EU West	S4 Disks	0.064512	0.099090432
Azure para estudiantes	01/12/18	Storage	Tables	All	LRS Data Stored	7.2E-05	0.00000504
Azure para estudiantes	01/12/18	Storage	Standard HDD Managed Disks	EU West	S30 Disks	0.032256	1.32120576
Azure para estudiantes	01/12/18	Storage	Tables	All	Batch Write Operations	0.0146	0.00000584
Azure para estudiantes	01/12/18	Storage	Standard Page Blob	All	LRS Data Stored	9.6E-05	0.0000048
Azure para estudiantes	02/12/18	Storage	Standard HDD Managed Disks	EU West	S4 Disks	0.059136	0.090832896
Azure para estudiantes	02/12/18	Storage	Tables	All	LRS Data Stored	6.9E-05	0.00000483
Azure para estudiantes	02/12/18	Storage	Standard HDD Managed Disks	EU West	S30 Disks	0.029568	1.21110528
Azure para estudiantes	02/12/18	Storage	Tables	All	Batch Write Operations	14	0.0000056
Azure para estudiantes	02/12/18	Storage	Standard Page Blob	All	LRS Data Stored	9.2E-05	0.0000046
Azure para estudiantes	03/12/18	Storage	Standard HDD Managed Disks	EU West	S4 Disks	0.034944	0.053673984
Azure para estudiantes	03/12/18	Storage	Tables	All	LRS Data Stored	4.2E-05	0.00000294
Azure para estudiantes	03/12/18	Storage	Standard HDD Managed Disks	EU West	S30 Disks	0.017472	0.71565312
Azure para estudiantes	03/12/18	Storage	Tables	All	Batch Write Operations	8	0.0000032
Azure para estudiantes	03/12/18	Storage	Standard Page Blob	All	LRS Data Stored	5.6E-05	0.0000028

▶ You pay money to have the machine even without running it because you are taking up space. *Use only what you need*.

Introduction PaaS and IaaS

▶ **What can I do to use cloud services more efficiently?**

  ▶ Three options:

    ▶ **IaaS**: based on virtualization technology. Running virtual machines as guests in a data center.

    ▶ **PaaS**: you get a platform on which applications are delivered.

    ▶ **SaaS**: the software is obtained directly through the web.

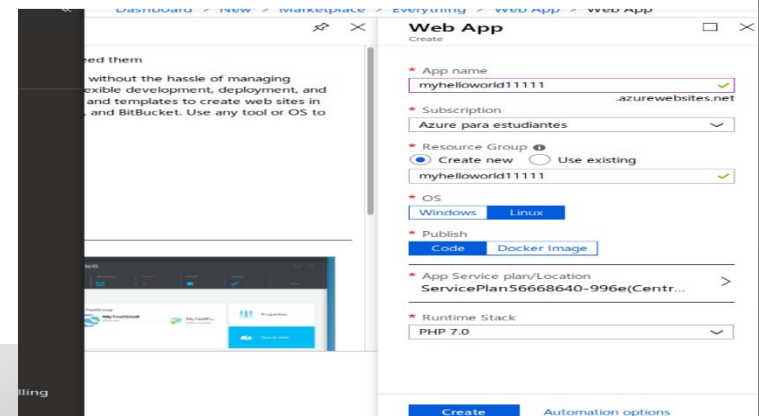 ▶ A fourth: no server. It's the lamda (AWS) or functions (Azure).(https://www.ibm.com/cloud/learn/iaas-paas-saas)[https://www.ibm.com/cloud/learn/iaas-paas-saas]

Introduction PaaS and IaaS

▶ **Example of PaaS with Azure**

   ▶ Create a resource and search for "web app". Select the "Web App" option and click "create".
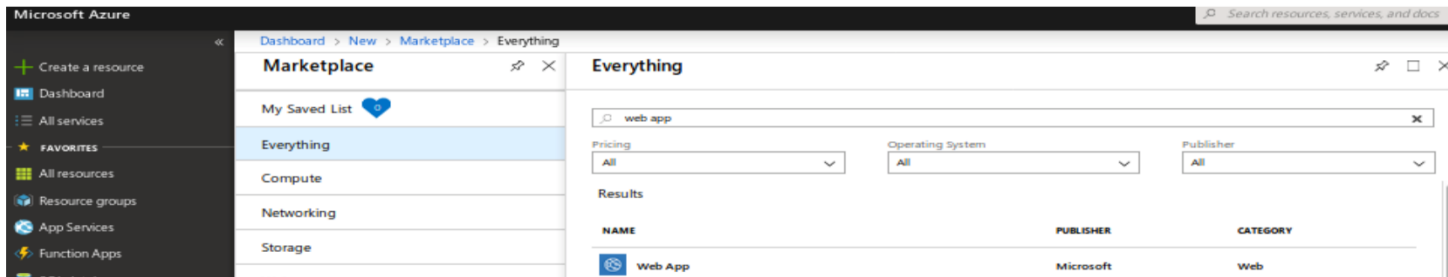
   ▶ Search for an unused web application name.

      ▶ Green check:

Introduction PaaS and IaaS

► **Example of PaaS with Azure**

    ► If you see this problem, which requires contacting, ignore it and try again later.

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▶ **PaaS with IBM Cloud example**

  ▶ Register at https://developer.ibm.com/academic/

  ▶ Enter the application panel https://console.bluemix.net/dashboard/apps/ and select "Create Resource".
  Choose Compute and Php
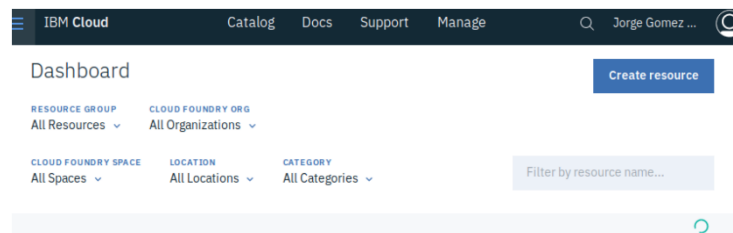
  ▶ Choose app name and pricing plan
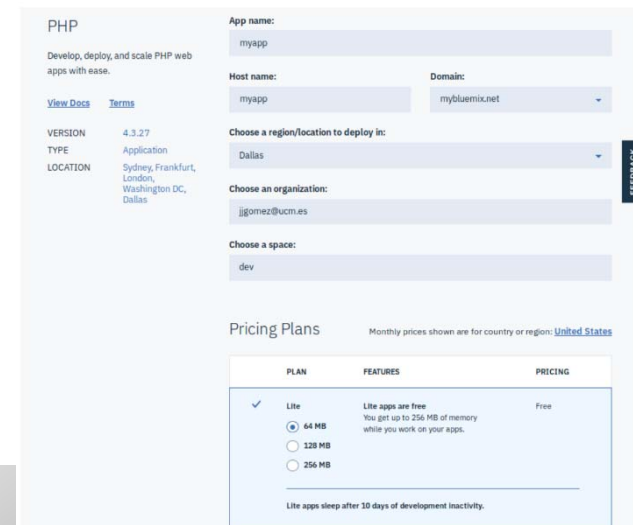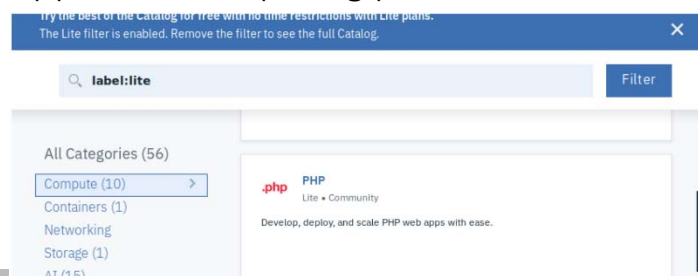
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▶ **PaaS with IBM Cloud example**

  ▶ If the host name is chosen (it must be unique), then this message will appear and must be changed.
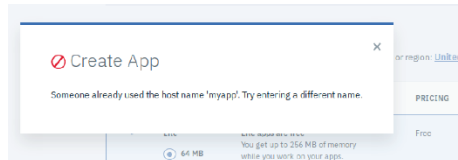
  ▶ IBM asks for the IBM Cloud command line interface to be installed and instructs if you want to update the code.

  If not, access the url of the app:

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▶ **APP development with IBM Cloud**

    ▶ Once the application is deployed and a name is assigned to it, it is necessary to upload the changes. 2 options:

        ▶ Using the **IBM Cloud** CLI (you need to install it on your computer)

        ▶ Using a **tool chain** and connecting the application to a git repo

    ▶ In the example above, click on "continuous delivery" and then on "creating a toolchain from an app". The tutorial indicates how to create a toolchain, how to assign the toolchain to an app. This is a summary:

        ▶ With the application, click on summary and then "enable" continuous delivery (bottom right).

Then click Cre...

in **create**
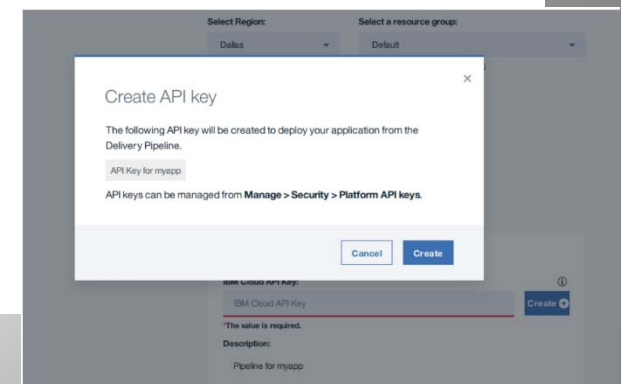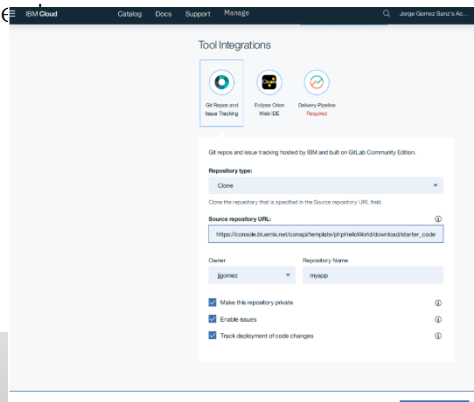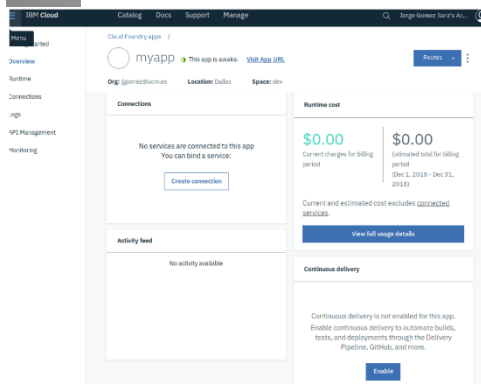
Introduction PaaS and IaaS

► **APP development with IBM Cloud**

   ► Test again.

When finished, you will have a repo, a SaaS with Eclipse Orion...
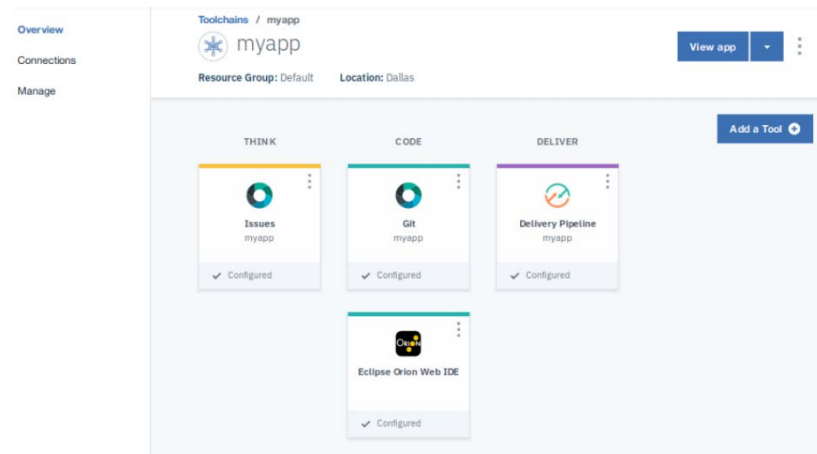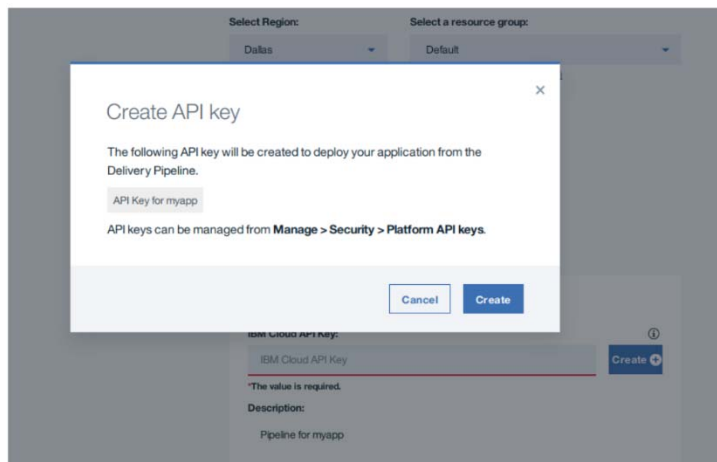
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▶ **APP development with IBM Cloud**

  ▶ You can access the toolchain again from the application script.

From here you can do whatever you want:

▶ Use Eclipse orion to access the file and edit it

▶ Clone the repo locally and drive the changes

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▶ **APP development with IBM Cloud**

  ▶ In order to make the changes visible, it is necessary to activate the delivery pipeline as in image 1.

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▶ **APP development with IBM Cloud**

  ▶ It may fail if the parameters are not the same. The application name must match the host name.

  ▶ Troubleshooting:

    ▶ messages with "the route... is already in user". The namespace "dev" and the same first name as the host name must be chosen in the delivery.

    ▶ I can't see the changes in the URL that IBM gave me. Verify that you have made changes to the git repository and that you went through the pipeline.

    ▶ The changes are not appearing. Try refreshing the web page where you view the application. It may change over time for a while.