

Hands On: tour por la consola Qiskit

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Fundación Sadosky

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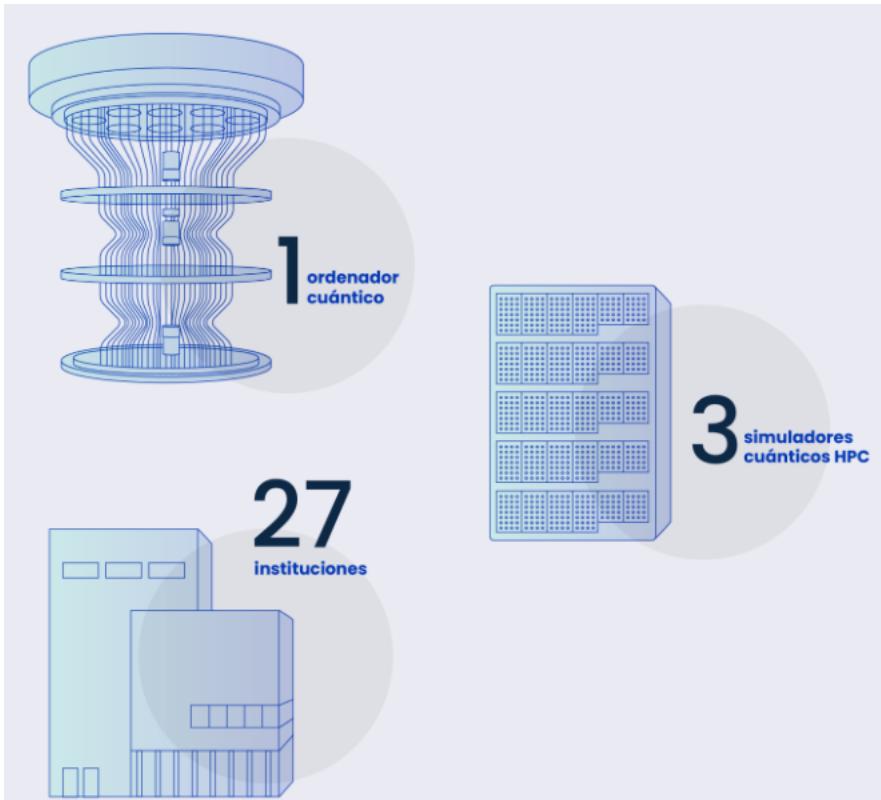
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Hands On: tour por la consola Qiskit

temario:

- Introducción a la Fundación Sadosky
- QC: **simulación** vs compu física
- QC: Python SDK
- entorno Jupyter: **local** vs nube
- Hello (Q)world!

simulación vs compu física



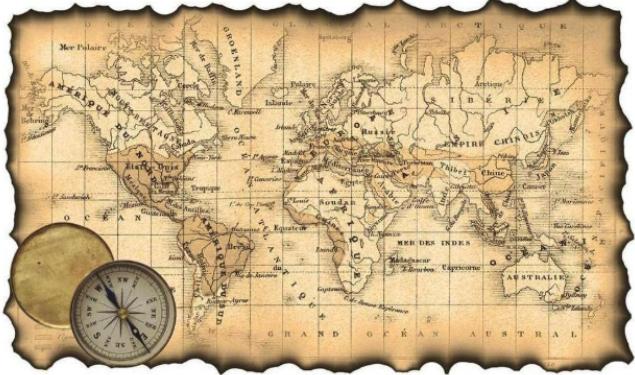
quantumspain-project.es

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panel de control



- <https://quantum.ibm.com>
- <https://quantum.cloud.ibm.com/learning/es>

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```
git clone https://github.com/leandro-fs/PUCP-Qday-2025.git
```



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<https://quantum.cloud.ibm.com/docs/es/guides/install-qiskit>

- *.ibm.com
- /docs/es
- /guides/install-qiskit



entorno Jupyter

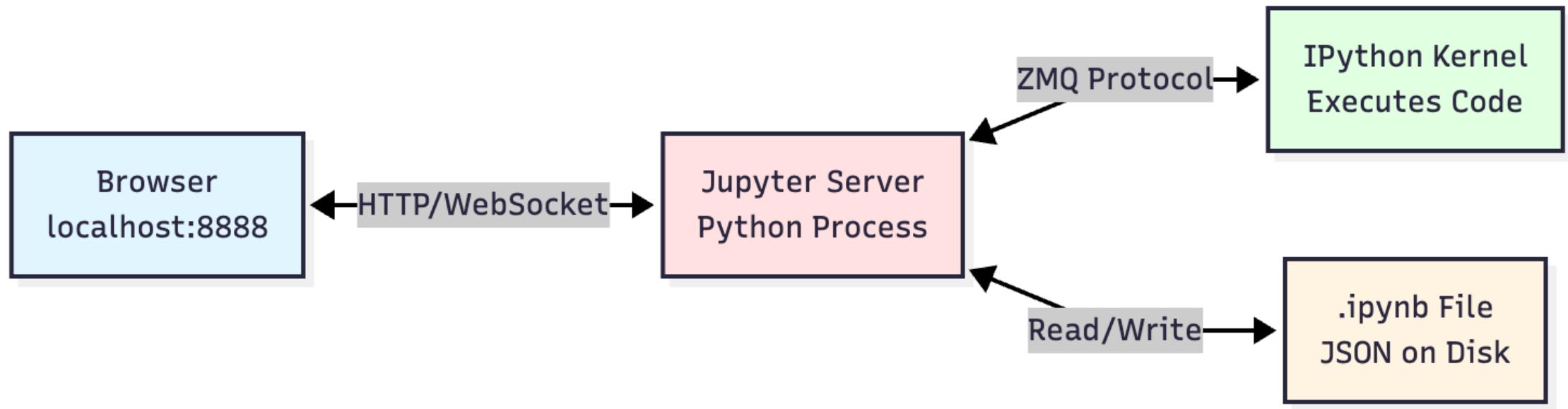
entorno	pro	con	⚠️ comentarios ⚠️
local	- control de versiones	- recursos limitados - localidad	evitar el entorno del SO
nube	- sin instalación	- costo directo	no incluye tiempo de <i>runtime</i>

simulación: cuadernos Jupyter

<https://jupyter.org/try-jupyter/lab/>

- celdas Markdown y ejecutables
- kernel: Py, Cpp, R, SQLite, Octave
- archivos JSON
 - Markdown
 - ejecutables
 - **resultados**

simulación: arquitectura Jupyter



- muchos cuadernos -> un kernel
- kernels variados
- Python: introspección, debugging

distribución: Python.org vs propietaria (1)

Característica	CPython (Oficial)	Anaconda
Mantenedor	Python Software Foundation	Anaconda Inc. (comercial)
Licencia	Licencia PSF (FLOSS)	BSD (nivel gratuito) + Comercial
Tamaño	~25-50 MB	~3-5 GB (instalación completa)
Gestor de Paquetes	pip	conda (+ pip)
Repositorio de Paquetes	PyPI (~500 mil paquetes)	Repositorio Anaconda (~8 mil paquetes)
Público Objetivo	Propósito general	CD/ML, científico, dominios

distribución: Python.org vs propietaria (2)

Característica	CPython (Oficial)	Anaconda
Bibliotecas Preinstaladas	Bibliotecas estándar	NumPy, pandas, Jupyter, +250
Manejo de Binarios	Fuente + wheels	Binarios precompilados
Entornos Virtuales	venv (stdlib 	entornos conda
Multi-paradigma	Solo Python	Python, R, Julia, etc.
Integración con el Sistema	Instalación a nivel del SO	Autocontenido

distribución: Python.org vs propietaria (3)

Característica	C P ython (Oficial)	Anaconda
Resolución de Dependencias	Básica (pip)	Avanzada (\neq solvers)
Velocidad (instalación)	Rápida (pip)	Más lenta (conda) Más rápida (mamba)
Espacio en Disco	Mínimo	Pesado
Filosofía FLOSS	FLOSS puro	Mixta (paquetes comerciales)

Anaconda: instalación MS Windows

<https://www.datacamp.com/es/tutorial/installing-anaconda-windows>

Anaconda: instalación Linux/MacOS

- instalar [Conda](#) (distribución privativa de Python, registración obligatoria)
- crear entorno Qday25 :

```
git clone https://github.com/leandro-fs/PUCP-Qday-2025.git  
cd PUCP-Qday-2025  
conda env create --solver libmamba --file Qday25.yml --name Qday25  
conda init #solo una vez, durante la instalación  
conda activate Qday25 #en cada sesión
```

⚠ --solver {classic,libmamba}

Anaconda: instalación Linux/MacOS

- ejecutar `jupyter lab` y abrir un cuaderno

```
cd # a nuestra carpeta  
conda activate Qday25 # nuevo prompt → Qday25 git:(main) ✘  
jupyter lab # abre navegador
```

Anaconda: actualización Linux/MacOS

- eventualmente, necesitaremos actualizar el entorno

```
cd # a la bóveda de Obsidian  
conda activate Qday25 # cambia el prompt  
conda env update --file Qday25.yml
```

[!read] documentado en <https://docs.conda.io/projects/conda/en/stable/commands/env/update.html>

opción:

```
conda activate Qday25 # cambia el prompt  
conda update --all
```

[!read] documentado en <https://docs.conda.io/projects/conda/en/stable/commands/update.html#>



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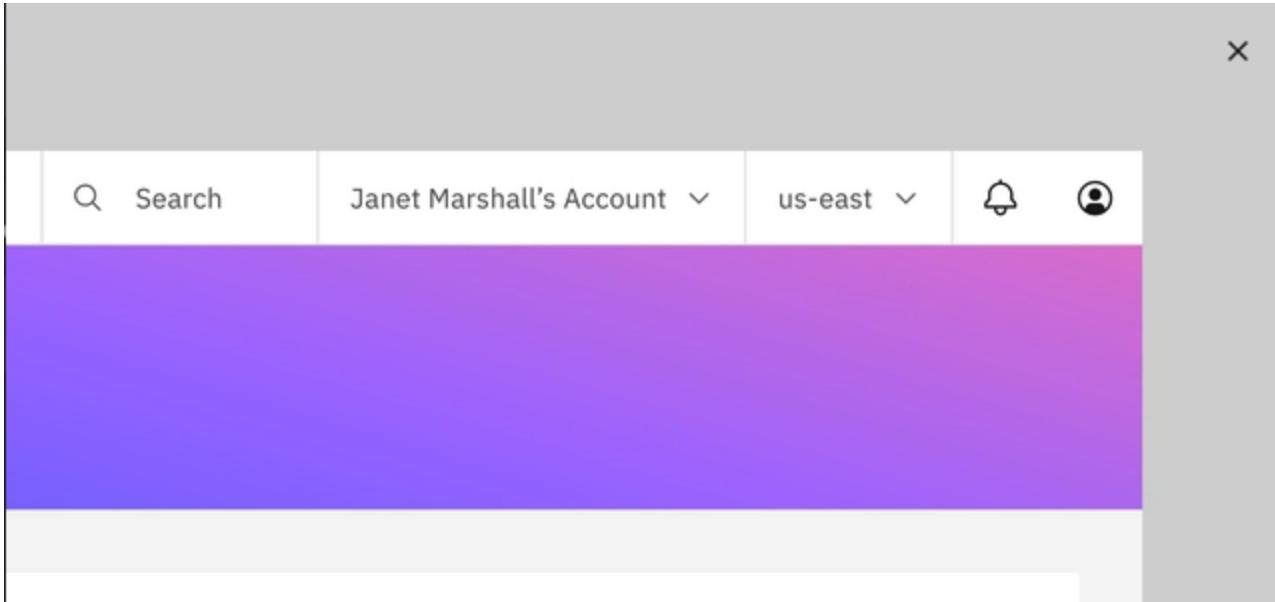
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Tour IBM Quantum Platform

Many different tools and components make up the platform. Click 'get started' to view how to access and manage your account resources.

Close

Get started →



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Accounts, regions, & resource visibility

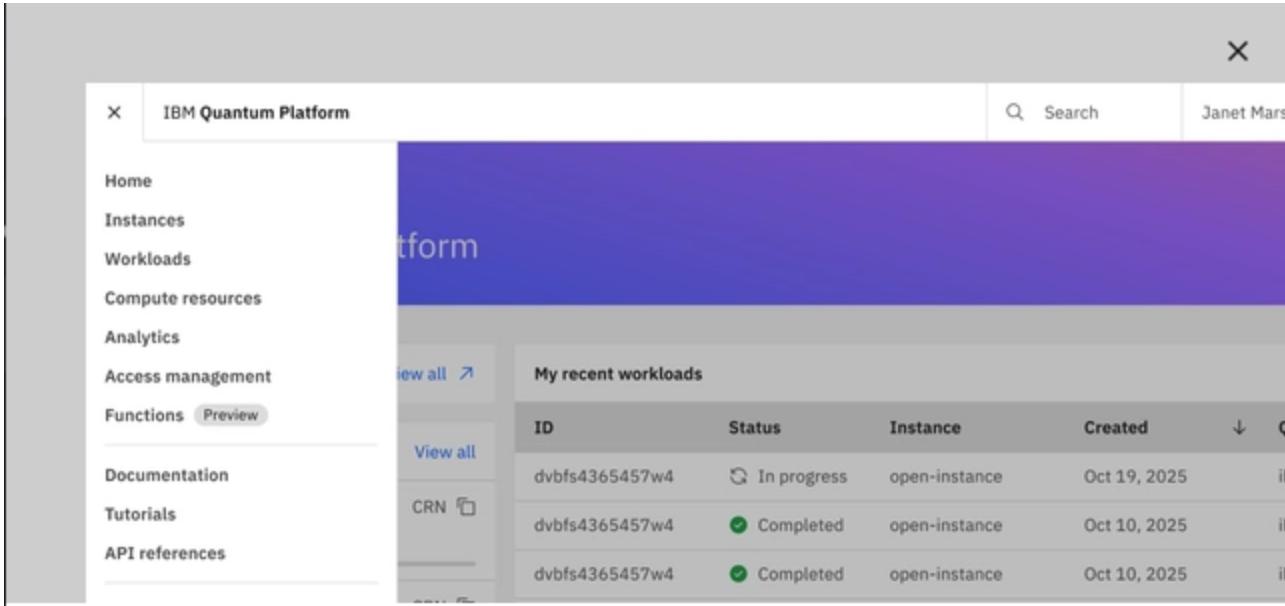
Use the dropdowns in the header to switch **IBM Cloud accounts** and **data locality regions**. You can filter by instance within specific pages.

Certain resources are account and region-specific, including instances and workloads. API keys generated from the dashboard are also account-specific.

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Navigating to other apps and pages

Use the main menu to access your workloads, instances, compute resources, and other tools across IBM Quantum Platform

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The screenshot shows the IBM Quantum instance management interface. On the left, there's a summary bar with 'Open (1)' and 'Standard (3)'. Below it, resource usage is shown: '7m 24s m' (Total used), '2m 36s' (Remaining to use), and '10 m' (Total available to plan). The current cycle is 'March 1, 2025 - March 31, 2025' (Current cycle (UTC)). A search bar says 'Search instances by name or CRN'. A table lists instances: 'open-instance' (CRN: crn:ibmq:open-instance..., Region: us-east, QPUs: 10, Usage remaining: 2m 36s). To the right, a modal window titled 'Instances' shows a list of instances: 'open-instance' (CRN: crn:ibmq:open-instance..., Open), 'default' (CRN: crn:ibmq:default..., Standard), 'main' (CRN: crn:ibmq:main..., Standard), and 'testing' (CRN: crn:ibmq:testing..., Standard). A tooltip with a hand cursor is over the 'Copy CRN' button for the 'main' instance.

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Creating and managing instances

Create an instance from the home or instances page pages to start submitting workloads on IBM QPUs. Use the instance's CRN when connecting to Qiskit.

Admins can allocate resources across an account's instances. Depending on the plan type and permissions, QPU time may be allocated across instances within the plan.

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The screenshot shows the 'Access management' page for the 'IBM Quantum Platform'. The 'Users' tab is selected. A table lists five users: Janet Marshall, Burt Goodman, Irving Bailiff, marksout2@lumon.org, and another user whose name is partially visible. Each row includes columns for Name, Email address, Access groups, Status, and Date added. A context menu is open over the first user's row, with options 'Manage access' and 'Remove user' highlighted. At the top right of the page, there is a 'Need help?' link and a 'View docs' button.

Name	Email address	Access groups	Status	Date added
Janet Marshall	janet_marshall@ibm.com	6	Active	Feb 1, 2025
Burt Goodman	burtg@lumon.org	4	Active	March 1, 2025
Irving Bailiff	irving.bailiff@inst.gov	3	Active	March 1, 2025
marksout2@lumon.org	marksout2@lumon.org	4	Active	March 12, 2025
[Redacted]	[Redacted]	9	Active	March 19, 2025

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Managing users

Account owners and administrators can grant users the ability to run workloads in instances from the Access Management page. Users must first be added to the account and then to the relevant instance access groups. Access group permissions can be managed in the IBM Cloud console.

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The screenshot shows the IBM Quantum Platform interface. The top navigation bar includes 'IBM Quantum Platform', 'Search', 'Janet Marshall's account', 'us-east', and notification icons. The main menu has tabs for 'Documentation', 'Guides', 'Tutorials' (which is underlined), 'API reference', and 'Additional resources'. On the left, a sidebar titled 'Tutorials' lists several options: 'Get started', 'Overview', 'Hello world' (which is selected and highlighted in blue), 'Variational quantum eigensolver', 'CHSH inequality', 'Explore workflows toward advantage', 'Verifiable sampling algorithms', 'Observable estimation', 'Fault-tolerant algorithms', 'Leverage Qiskit capabilities', 'Workload optimization', and 'Qiskit Functions' (with a 'New' badge). The main content area is titled 'Hello world' with a subtitle 'Package versions'. It contains text about creating a simple quantum program and running it on a QPU. Below this is a section titled 'Before you begin' with a note about installing Qiskit. To the right, there's a sidebar titled 'On this page' with a 'Before you begin' section containing four steps: 'Create and run a simple quantum program', 'Step 1. Map the problem to a quantum-native format', 'Step 2. Optimize the circuits and operators', 'Step 3. Execute using the quantum primitives', and 'Step 4. Analyze the results'. There are also 'Download notebook' and 'Was this page helpful?' buttons.

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Get started with Qiskit

After your instances and allocation are set up, you are ready to get started with Qiskit. Check out the [documentation](#) ↗ for detailed instructions.

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Hello (Q)world

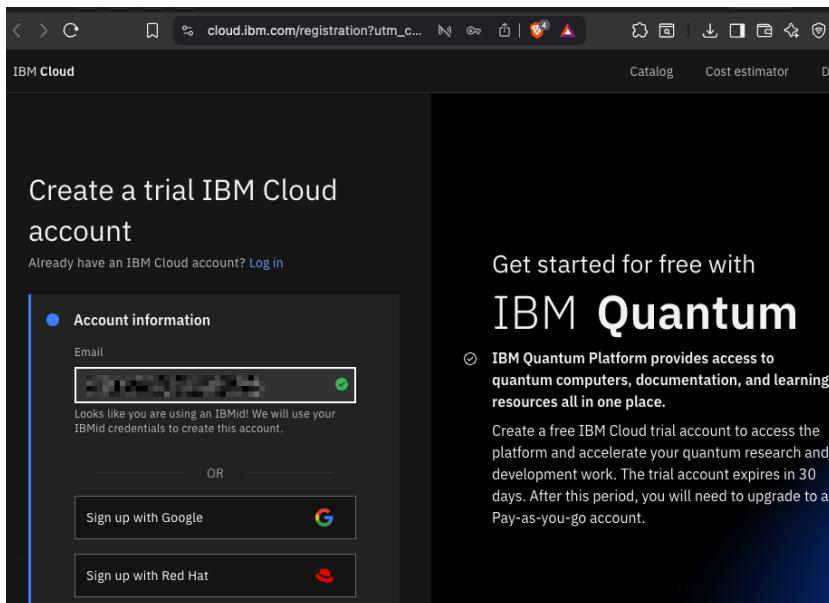
<https://quantum.cloud.ibm.com/docs/es/tutorials/hello-world>

- cloud.ibm.com
- quantum.cloud.ibm.com
- /docs/
- es
- /tutorials/hello-world

paso intermedio: <https://quantum.cloud.ibm.com/docs/es/guides/quick-start>

quantum.cloud.ibm.com

"Get 10 free minutes of runtime each month with an Open Plan instance, which is required to run and manage workloads on your account"



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Credenciales y APIkey

cuaderno `credenciales.ipynb`

<https://quantum.cloud.ibm.com/docs/es/guides/save-credentials>

- una API key de IBM Cloud (para gestión de recursos de IBM Cloud)
- una API key de IBM Quantum Platform.
 - i. Ve a: <https://quantum.ibm.com/> (no a cloud.ibm.com)
 - ii. Iniciar sesión
 - iii. Selecciona "Configuración de cuenta" o "Account settings"
 - iv. En la sección "API token", copia el token (será una cadena larga de caracteres)

de nuevo:

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- ~~X~~ <https://cloud.ibm.com/iam/apikeys> → API keys para IBM Cloud

Conclusiones

- La Computación Cuántica es *en la nube*
- La Programación, es local
- Mucho Python
- **quantum.cloud.ibm.com** es un mundo esperando ser descubierto

entornos Python

entorno	pro	con
local python.org	- control de versiones	- recursos limitados - localidad
local Anaconda	- control de versiones - entorno mas replicable	- recursos limitados
Nube	- sin instalación	- costo directo - colaboración(😢)

Preguntas? Gracias!