

# Hands On: tour por la consola Qiskit

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16/dic/2025



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# Quantum Day

## CONTENIDO

- QUANTUM 101 Y LA ERA DE LA UTILIDAD CUÁNTICA:  
CONCEPTOS, CASOS DE USO Y PROGRAMACIÓN CUÁNTICA.
- QUANTUM SAFE: RIESGOS DE SISTEMAS RSA E IMPACTOS A  
LA SEGURIDAD.
- TALLER DE QISKIT (Cupos limitados)

Inscripciones:



**Fecha:** 16 de diciembre

**Horario:** 9m - 1p.m.

**Lugar:** Auditorio de Derecho



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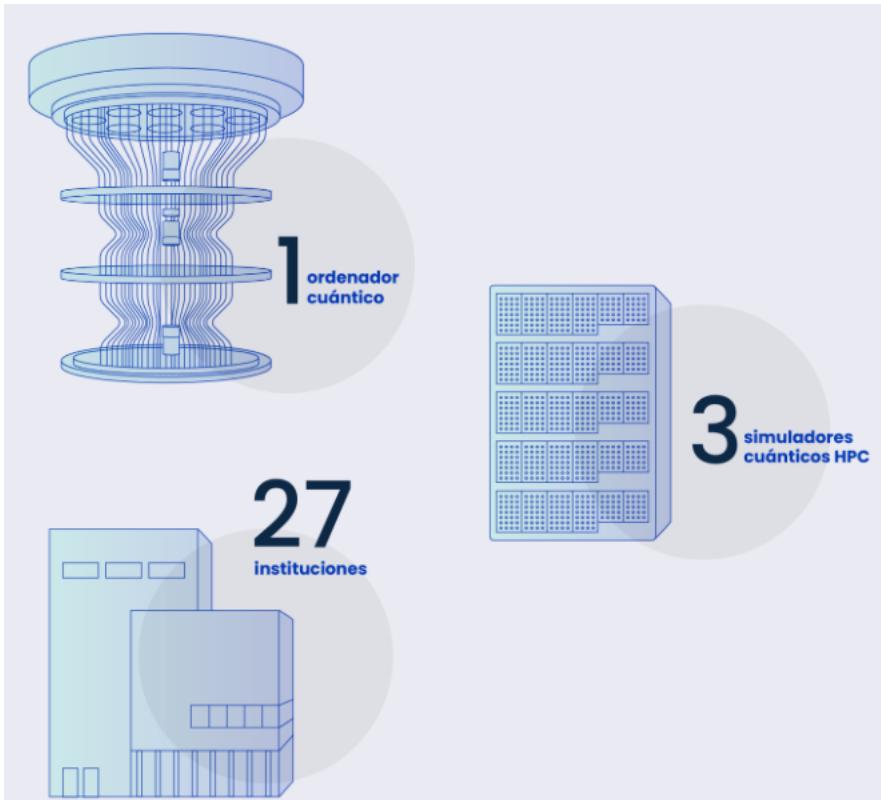
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# Hands On: tour por la consola Qiskit

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](http://quantumspain-project.es)

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# También hay computadoras cuánticas educativas!



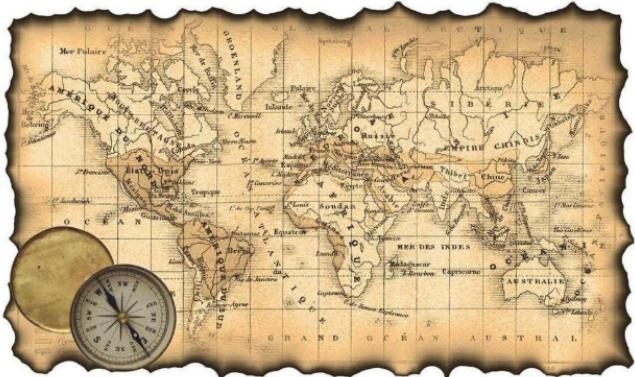
<https://unahur.edu.ar/instituto-de-tecnologia-e-ingenieria/>

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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

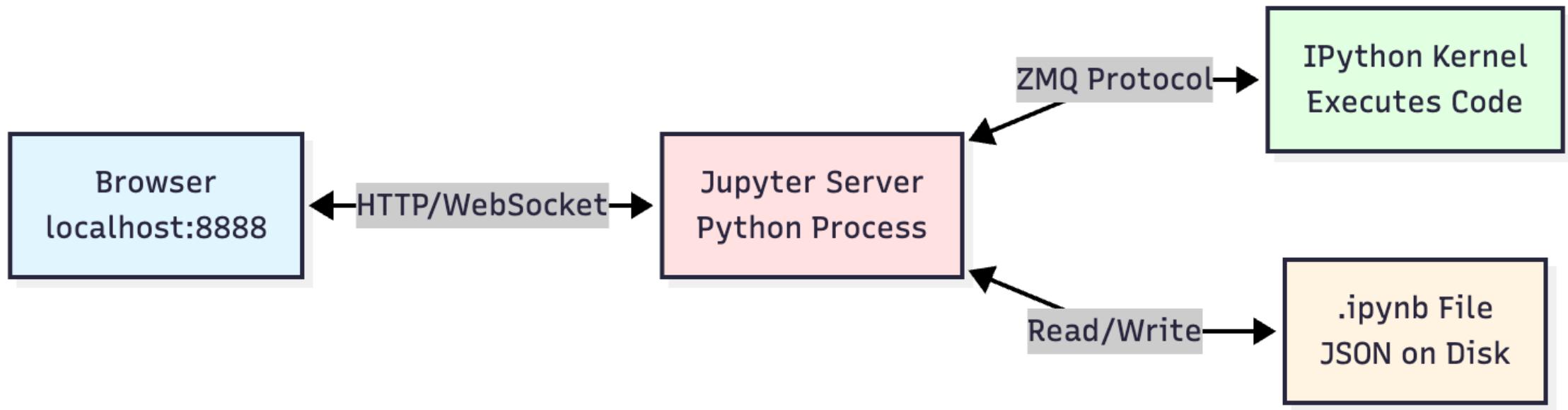
entorno	pro	con	⚠️ comentarios ⚠️
local	- control de versiones	- recursos limitados - localidad	evitar el entorno del SO
nube	- sin instalación	- costo directo	no incluye tiempo de <i>runtime</i>

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

## distribución: Python.org vs propietaria (3)

Característica	C <del>P</del> 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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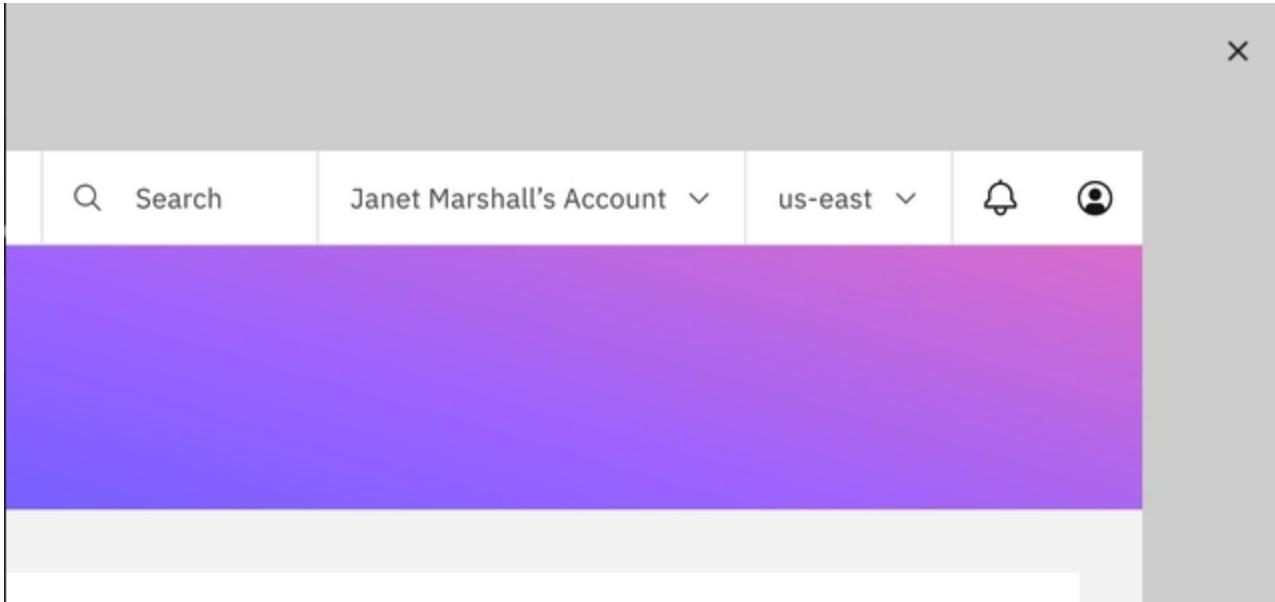
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## Tour IBM Quantum Platform

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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The screenshot shows the IBM Quantum Platform interface. On the left, there is a sidebar with a list of navigation items: Home, Instances, Workloads, Compute resources, Analytics, Access management, Functions (with 'Preview' selected), Documentation, Tutorials, and API references. The 'Functions' item has a dropdown menu open, showing 'View all' and 'CRN'. The main content area displays a table titled 'My recent workloads' with three rows of data. The columns are ID, Status, Instance, Created, and Options. The first row shows 'dvbf4365457w4' with 'In progress' status, 'open-instance' instance, and 'Oct 19, 2025' created date. The second and third rows show 'dvbf4365457w4' with 'Completed' status, 'open-instance' instance, and 'Oct 10, 2025' created date.

ID	Status	Instance	Created	Options
dvbf4365457w4	In progress	open-instance	Oct 19, 2025	[...]
dvbf4365457w4	Completed	open-instance	Oct 10, 2025	[...]
dvbf4365457w4	Completed	open-instance	Oct 10, 2025	[...]

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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, Cycle usage: 7m 24sm, Usage remaining: 2m 36s, Tags: Test). On the right, a tooltip for the 'Copy CRN' button of the 'main' instance is displayed, with a hand cursor hovering over it.

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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 in the IBM Quantum Platform. The top navigation bar includes 'IBM Quantum Platform', 'Search', 'Janet Marshall's account', 'us-east', and a help section. Below the header, the title 'Access management' is displayed, followed by tabs for 'Users' (selected) and 'Access groups'. A note states: 'All users added to this account. Users must be added to the account before they can be given access to instance resources via access groups.' A search bar and an 'Add users' button are present. The main table lists users with columns: Name, Email address, Access groups, Status, and Date added. The table contains five rows of data. A context menu is open over the fifth row, listing 'Manage access' and 'Remove user'. A cursor is hovering over the 'Manage access' option.

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
markscout2	markscout2@lumon.org	4	Active	March 12, 2025
waterfall99blue	waterfall99blue@ibm.com	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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Close

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# Hello (Q)world

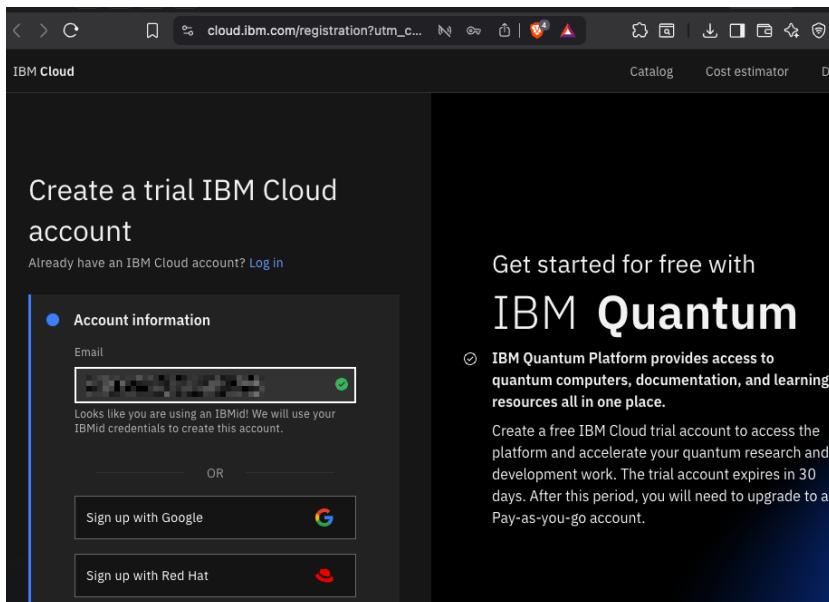
<https://quantum.cloud.ibm.com/docs/es/tutorials/hello-world>

- 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

Preguntas?

**Gracias!**



- Ing. Leandro Batlle



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