# APIs

Python for Economics Morning, Aug 14, 2024 Richard Lawrence



#### This Module

- 1. JSON Format
- 2. Requests
- 3. FRED API

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- 4. Capstone Project
- 5. Launch Cluster



## JSON - JavaScript Object Notation

- A text format for storing data
- language-independent (why they should know json)

#### JSON string examples:

'{"name":"Jack", "age":20, "major":"computer science"}'

'{ "args": {}, "data": "", "files": {}, "form": {
"soup": "hot soup" }, .... }'

loads() function -> Python dictionary

## JSON module

- Python built-in module **json**
- json.loads(): converts JSON string to Python dictionary
- Example:

```
import json
text = "{ keys : values, ... }"
dict = json.loads(text)
```

#### Requests

**Requests** library for HTTP activities.

Replicate the experience of visiting a web page, but in a Notebook instead of a Browser.





#### Accessing Federal Reserve Economic Data



### Web Scraping API Exercise

#### Fred API

Retrieve economic data from the FRED® and ALFRED® websites hosted by the Economic Research Division of the Federal Reserve Bank of St. Louis

Reference: <u>https://fred.stlouisfed.org/docs/api/fred/</u>



## Get an API Key

<u>Register</u> and log into your fredaccount.stlouisfed.org user account and request your API Key.

Most web services require an API key to identify who owns a request.



## Break Time Reminder Slide

#### 10 minutes break







#### Putting It All Together





#### Supercomputing Cluster at Texas A&M



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## Getting on Launch

- You must have an <u>ACCESS</u> account (we did this yesterday)
- Once we have your ACCESS ID, we can give you an account on Launch
- Email us at <u>help@hprc.tamu.edu</u> for questions, comments, and concerns.

Home Quick Start User Guides	s Software Helpful Pages	FAQ	
User Guides ACES > FASTER > Grace > Launch ~	Hardware Launch: A Dell x86	) HPC Cluster	Table of contents Launch: A Dell x86 HPC Cluste Compute Nodes Login Nodes
Hardware Key Policies	System Name:	Launch	
Accessing	Operating System:	Red Hat Enterprise 8	
Computing Environment File Systems Compiling and Running Code	Total Compute Cores/Nodes:	8640 cores 45 nodes	
Batch System OnDemand Portal	Compute Nodes:	35 AMD Genoa CPU Nodes with 384 GB 10 AMD Genoa GPU nodes each with 2 NVIDIAA30s and 768 GB	
Galaxy LMS	Interconnect:	NVIDIA HDR100	
AMS	Peak Performance:	436 TFLOPS	
	Global Disk:	2.2 PB (usable) via Dell storage server	

See our KnowledgeBase at <a href="https://hprc.tamu.edu/kb/User-Guides/Launch/">https://hprc.tamu.edu/kb/User-Guides/Launch/</a> for more information

## HPRC Portal



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## Accessing Launch via the HPRC Portal (ACCESS)

ALLOCATIONS SUPPORT OPERATIONS METRICS	
TACCESS	
ACCESS	Central Authentication Service Activate Your NetD
Consent to Attribute Release	
TAMU LAUNCH ACCESS OIDC requests access to the following information. If you do not approve this request, do not proceed.  • Your CiLogon user identifier	LOG IN
Your name     Your email address     Your exemame and affiliation from your identity provider	Current Users
	NetD or Email Address
Select an Identity Provider	Passanrd
Texas A&M University	Next
Remember this selection	Forgot your password?
LOG ON	New Student or Employee? Activate your NetID
By selecting "Log On", you agree to the <b>privacy policy</b> .	

Select the Identity Provider appropriate for your account.

You need an ACCESS account, but can choose to log in with your TAMU NetID here.

## Shell access via the HPRC Portal

Access through (most) web browsers –Top Banner Menu "Clusters" -> "Shell Access"





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## Accessing Jupyter Notebooks on Launch





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Interactive Apps	Jupyter Notebook (1786) Host: Lat Created at: 2024-08-07 15:41:16 CDT	1 node   1 core   R	unning Delete n take	e a few	iends on the	
Servers ⇒ Jupyter Notebook ⇒ JupyterLab	Time Remaining: 59 minutes Session ID: 9b766dcf-bbeb-4b7a-9 Connect to Jupyter	The job will k Once this butt	pe queued on appears	and take , click it t	time to states the	art e ap

# **HPRC Clusters**

Python for Economics Afternoon, Aug 14, 2024 Richard Lawrence



## **HPRC Clusters**



We'll focus on these two today

Grace is larger and TAMU-specific

**Launch** is accessible to some other institutions, but newer and less busy



#### Launch



## Getting on Launch

- You must have an <u>ACCESS</u> account (this is a national program, not TAMU-specific)
- Once you send us your ACCESS ID, we can give you an account on Launch
- Email us at <u>help@hprc.tamu.edu</u> for questions, comments, and concerns.

Note: an ACCESS ID can help get onto the FASTER and ACES clusters as well!

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Home Quick Start	User Guides	Software Helpful Pages	FAQ	
<b>User Guides</b> ACES FASTER	> >	Hardware		Table of contents Launch: A Dell x86 HPC Clus Compute Nodes
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## **ACCESS ID Registration**

Navigate to (link in Classroom): <u>https://identity.access-ci.org/new-user</u>





## Register with an Existing Identity

#### Click on the **first** option

Two Options for New User Registration

If you don't already have an XSEDE or ACCESS account, there are two registration options:

1. <u>Register with an existing identity</u>: Using an existing University account when registering with ACCESS simplifies the sign-up process and enables you to log in to ACCESS using that existing account. With this option, creating an ACCESS-specific password is optional during registration, and you will also have the option to create an ACCESS-specific password later if needed.

If your University is not included in the listing or you have trouble logging in with your University account, please use the other registration option.

 Register without an existing identity: With this option, you'll be prompted to enter all your registration info and select an ACCESSspecific password and set up <u>Duo MFA for ACCESS</u>. You can <u>link</u> a GitHub, Google, Microsoft, ORCID, or University account later if desired.

When configuring Duo MFA, we recommend that you install the Duo security app on your phone and configure it to use "Duo Push".



## Choose Texas A&M University

- Start typing in "Texas A&M University"
- Select it when it appears (be sure not to select a different campus)

Consent to Attribute Release	~
ACCESS Registry requests access to the following information. If you do not approve this request, do not proceed.	
Your CILogon user identifier	
Your name	
Your email address	
elect an Identity Provider	
ACCESS CI (XSEDE)	- Ø
texas	
Texas A&M University	
Texas A&M University - San Antonio	
Texas A&M University System Cybersecurity	



Central Authentication Service	🗮 Menu
LOG IN	
Current Users	
NetID or Email Address Do The Thing Resourced	
Next	
Forgot your password? New Student or Employee? Activate your NetID	

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### Getting on Grace



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#### Accessing Clusters



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Our homepage: <u>https://hprc.tamu.edu/</u>

HPRC Helpdesk email: <u>help@hprc.tamu.edu</u>

