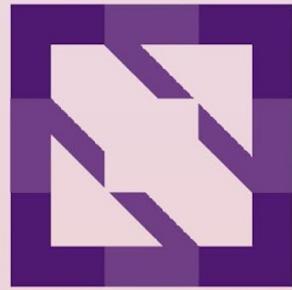




KubeCon

North America 2023



CloudNativeCon



KubeCon



CloudNativeCon

North America 2023

An Offer You Can't Refuse: Discovering Chicago Film Sets with MLOps in Kubernetes

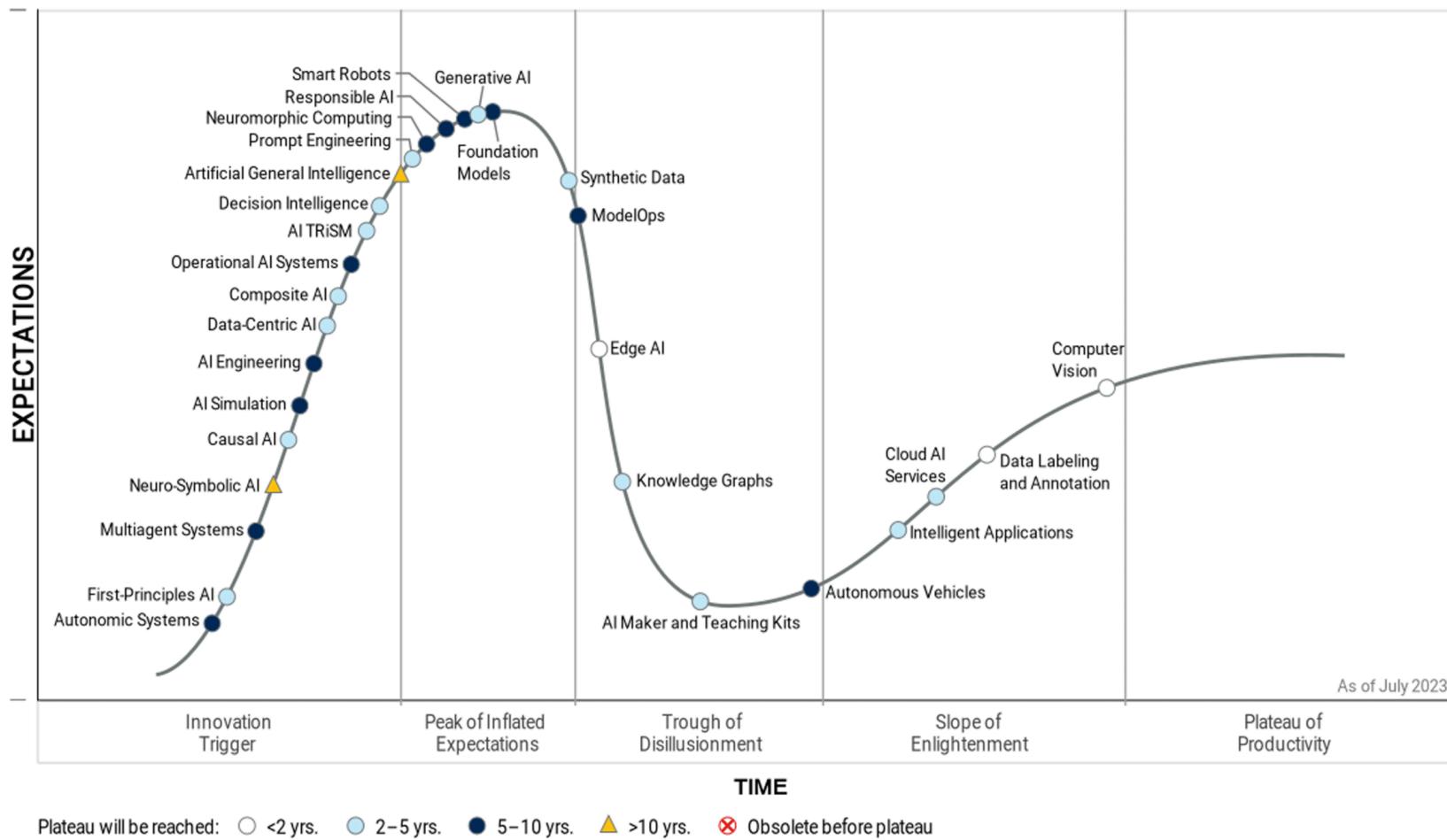
Annie Talvasto & Adi Polak



PromCon
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Figure 1: Hype Cycle for Artificial Intelligence, 2023

Hype Cycle for Artificial Intelligence, 2023



Gartner

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@AdiPolak



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North America 2021



Annie Talvasto

- CMO at VSHN
- CNCF Ambassador & Azure MVP
- CloudGossip podcast
- Cloud Native Live



Adi Polak

- Author of Scaling Machine Learning (O'Reilly)
- Databricks Ambassador

@AnnieTalvasto

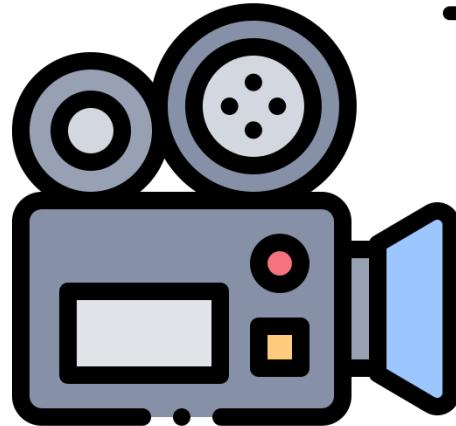
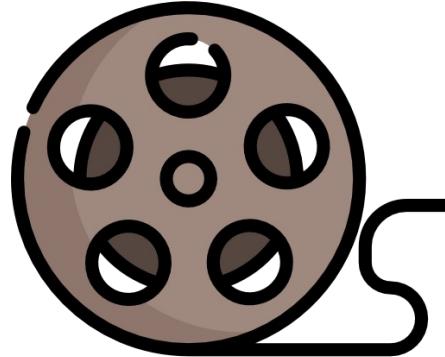
@AdiPolak



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Agenda

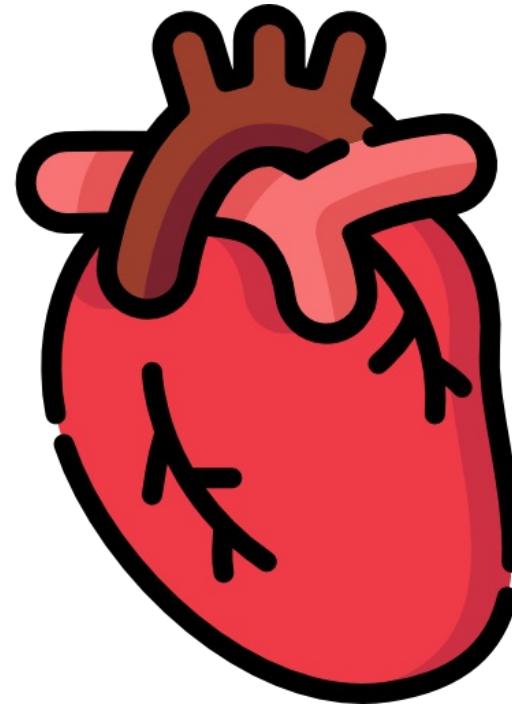
- Introduction
- Best Practices
- Demo
- Open-source stack
- Resources





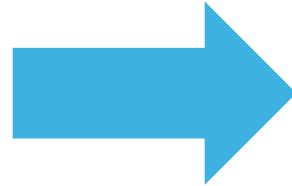
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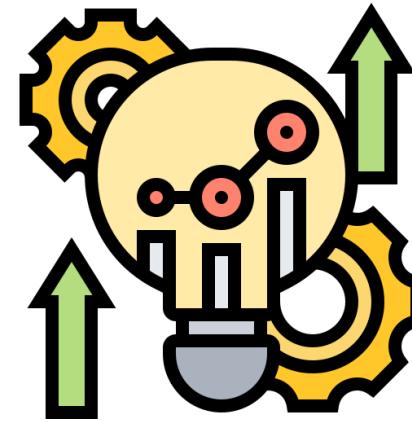
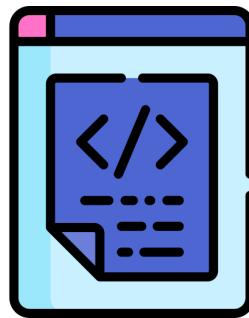
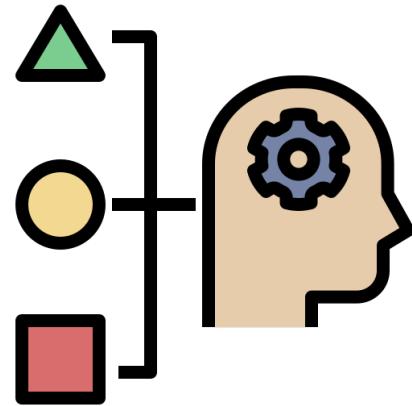
MLOps



Kubernetes

From Research to Production



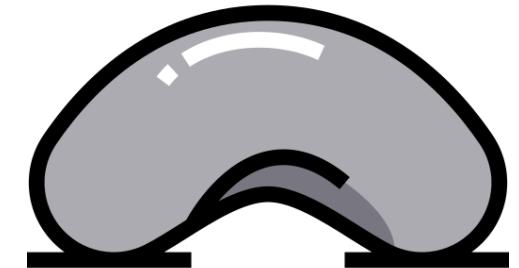
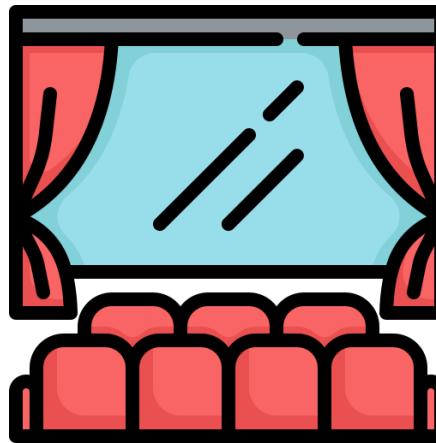


Experiment --> Dev --> Staging --> Production



Chicago & Movies

- Famous movies filmed in Chicago:
 - Ferris Bueller's Day Off (1985)
 - Transformers 3 & 4 (2010, 2013)
 - Batman Begins (2005)
 - The Dark Knight (2017)
 - Batman v Superman: The Dawn of Justice (2014)
 - The Batman (2021)





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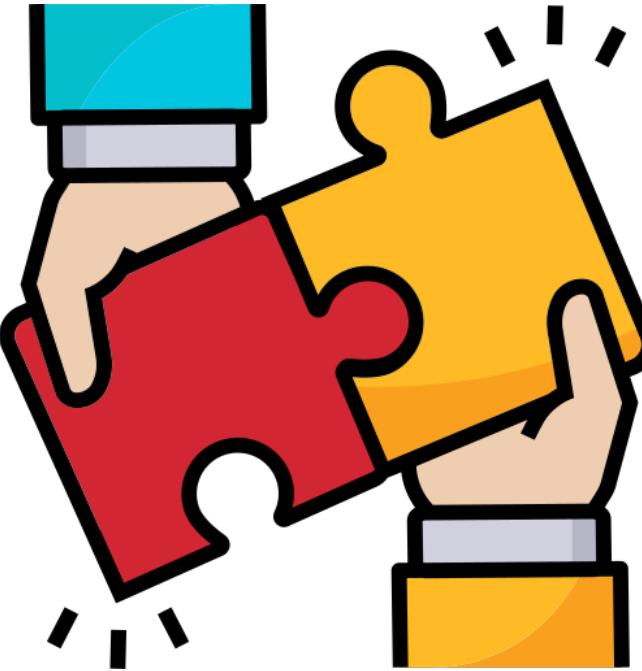
6 (and some extra) Best Practices for MLOps





Best Practice #1: Collaboration

- Develop with customer in mind.
- Cross teams- skills/knowledge.





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Best Practice #1: Collaboration

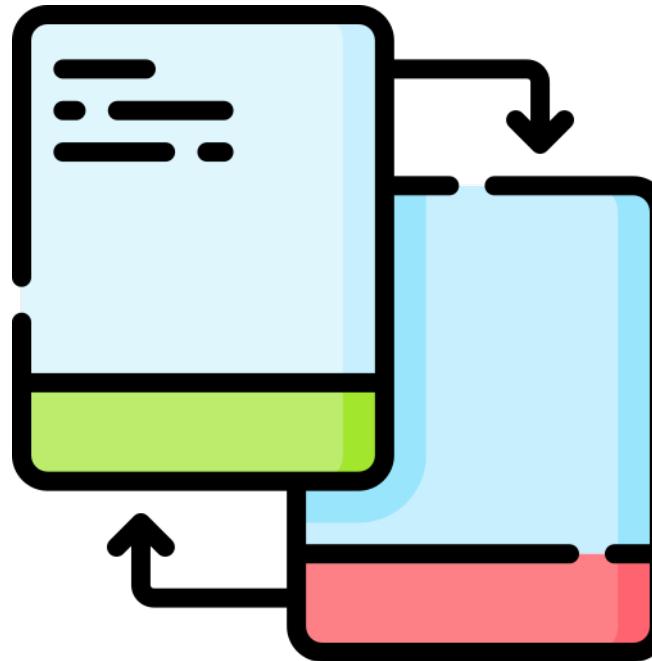


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Best Practice #2: Version Control & Model Versioning





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Best Practice #2: Version Control & Model Versioning



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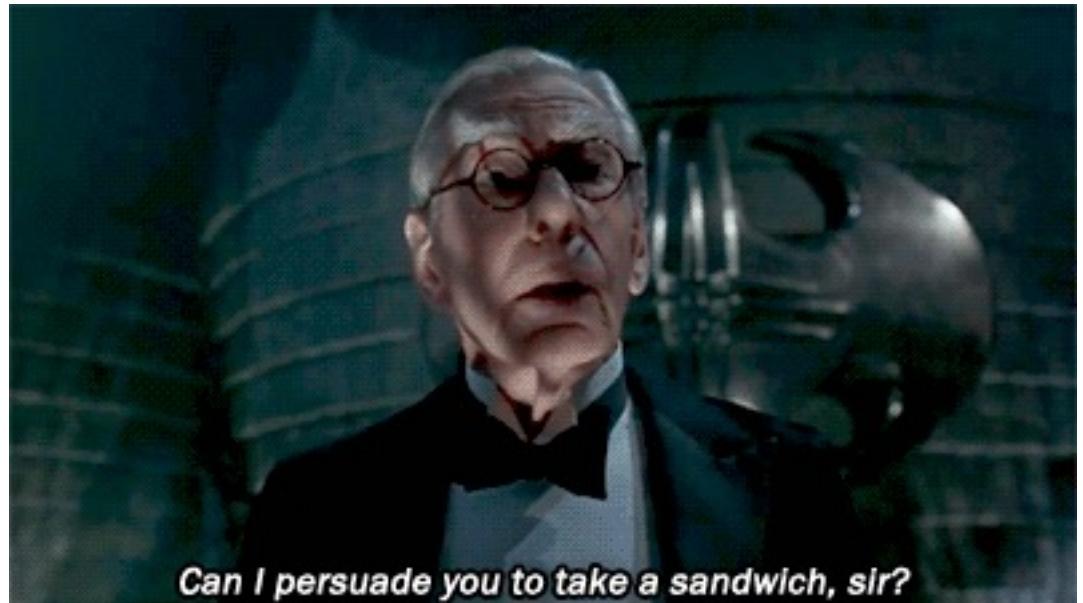


Best Practice #3: Automated Testing & CI/CD





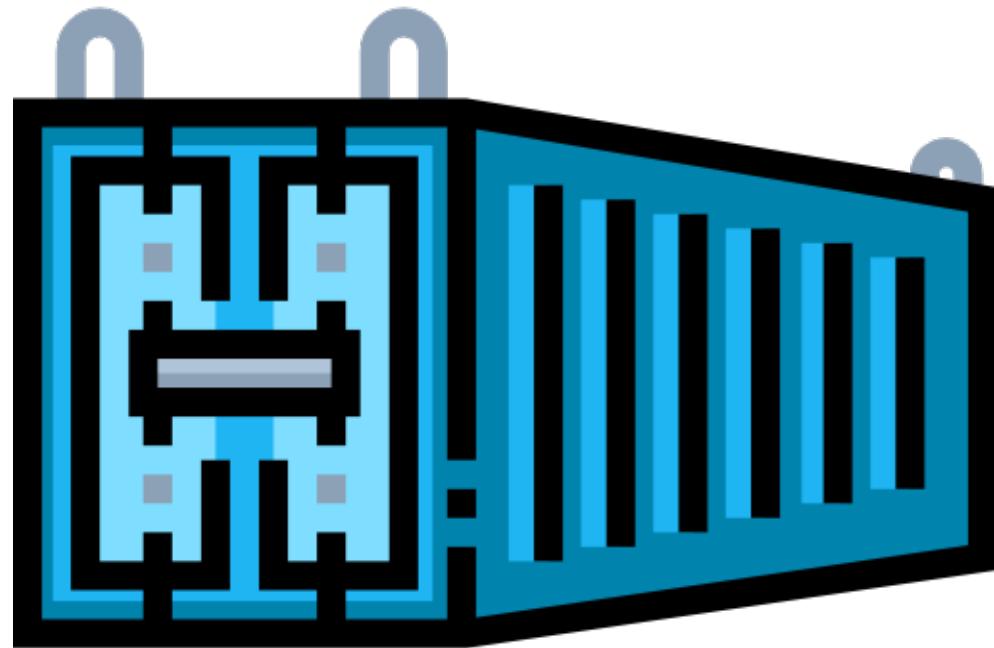
Best Practice #3: Automated Testing & CI/CD





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Best Practice #4: Containerization





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Best Practice #4: Containerization



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Best Practice #5: Monitoring & Logging, Security & Documentation





Best Practice #5: Monitoring & Logging, Security & Documentation





Best Practice #6: Scalability

- Training topologies
- Inferencing





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Best Practice #6: Scalability





Best Practice Rapid Fire:

- MLOps ❤️ DevOps
- Understand bottlenecks
- Uplevelling your skills
- It is all in the data





About the Data:

Chicago Data Portal:
Filming Permits –
Transportation
Department

<https://data.cityofchicago.org/Community-Economic-Development/Filming-Permits-Transportation-Department/c2az-nhru>





About this Dataset

Updated

November 5, 2023

Data Last Updated

November 5, 2023

Metadata Last Updated

April 21, 2016

Date Created

April 21, 2016

Views

47.5K

Downloads

4,102

Data Provided by

City of Chicago

Dataset Owner

Jonathan Levy

Contact Dataset Owner

Metadata

Data Owner

Department of Transportation

Time Period

2015 - Current

Frequency

Data are updated daily.

Topics

Category

Community & Economic Development

Tags

permits, movies, television, filming, transportation, streets

Licensing and Attribution

License

The license for this dataset is unspecified

Source Link

<http://www.cityofchicago.org>

What's in this Dataset?

Rows

42.1K

Columns

43

Each row is a

Permit Application

Columns in this Dataset

Column Name	Description	Type	
APPLICATIONNUMBER	Unique number for the application that becomes the permit nu...	Plain Text	T
APPLICATIONTYPE	Code for the type of permit. Permits may be categorized furth...	Plain Text	T
APPLICATIONDESCRIPTION	Type of permit.	Plain Text	T
WORKTYPE	Code for the sub-category, if any, of the permit application. Onl...	Plain Text	T
WORKTYPEDESCRIPTION	Sub-category, if any, of the permit application. Only one work t...	Plain Text	T
APPLICATIONSTATUS	Overall status of the application. Typically open during the app...	Plain Text	T
CURRENTMILESTONE	The current step in the permitting life cycle.	Plain Text	T

[Show All \(43\)](#)

Filming Permits - Transportation Department

 Based on [Transportation Department Permits](#)

Applications to the Chicago Department of Transportation for permits under its jurisdiction where the work type is ▶

[More View](#)

⋮	CURRENTMILESTONE	APPLICATIONSTARTDATE	APPLICATIONENDDATE	APPLICATIONPROCESSEDDATE	⋮	APPLI
	Incomplete Application	05/04/2024	05/04/2024			
	Incomplete Application	11/28/2023	11/28/2023			
	Application in Review	11/18/2023	11/18/2023	11/03/2023		
	Incomplete Application	11/18/2023	11/18/2023			
	Application in Review	11/12/2023	11/12/2023	10/24/2023		
	Cancelled	11/12/2023	11/12/2023	10/30/2023		
	Application in Review	11/12/2023	11/12/2023	11/01/2023		
	Application in Review	11/11/2023	11/12/2023	10/25/2023		
	Incomplete Application	11/11/2023	11/12/2023			
	Application in Review	11/11/2023	11/11/2023	11/01/2023		
	Application in Review	11/11/2023	11/11/2023	11/01/2023		
	Application in Review	11/11/2023	11/11/2023	11/01/2023		
	Application in Review	11/11/2023	11/11/2023	11/01/2023		
	Application in Review	11/11/2023	11/11/2023	11/01/2023		
	Application in Review	11/11/2023	11/11/2023	11/01/2023		
	Incomplete Application	11/10/2023	11/13/2023			
	Cancelled	11/10/2023	11/12/2023	10/11/2023		
	Incomplete Application	11/10/2023	11/11/2023			
	Application in Review	11/10/2023	11/10/2023	11/01/2023		



Filming Permits - Transportation Department

Based on [Transportation Department Permits](#)

Applications to the Chicago Department of Transportation for permits under its jurisdiction where the work type is ›

[More V](#)

APPLICATIONNAME	COMMENTS
Willowbrook High School Prom	Willowbrook High School is hosting their 2024 prom at the Chicago Sports Museum in the Water Tower We would like to have the kids be able to take pict...
RED CROSS TELETHON 2023	Red Cross Day of Giving telethon hosted by Paramount Global/CBS
Tradiciones	An character named Iker sets up his food stand at a corner and other three characters buy from the food stand.
When Everything Was Given Away	When Everything Was Given Away is a short thesis project for a Columbia College Chicago cinematography class. The scene that requires a permit entails...
"Glad To Know You"	Exterior film shoot of an accident site for film project entitled "Glad to Know You". This will involve actors, extras, film crew, and a parked truck.
Whisper of His Film Permit 2	Two people walking down a sidewalk and having conversation
Whisper of His Location	The scene will look like a car is driving on the road on (N Simmonds), people will then argue in the car, then the car stops at (610 W Lawrence), then a per...
Baby	Indie Short Film. Filming car that is parked on the side of the street. Need room for working vehicles.
Whisper of His MFA Thesis 4	Parking Spot needed for Equipment Truck
Hello Again, Goodbye	Filming a DePaul University student film.
Hello Again, Goodbye	Filming a DePaul University student film.
Hello Again, Goodbye	Filming a DePaul University student film.
Hello Again, Goodbye	Filming a DePaul University student film.
Hello Again, Goodbye	Filming a DePaul University student film.
Columbia College - Mama	Columbia College Chicago BFA thesis film shooting inside a studio, in need of UHaul parking outside the location.
Student film/ Mortified Maggie	Filming a dialogue and karate scene with four actors and an actor in a parked car. Karate in this scene is choreographed and contains no stunts.
23F-0047 : Hello Again, Goodby	Filming Student Film Production
Hello Again, Goodbye	Filming a DePaul University student film.



Filming Permits - Transportation Department

Based on [Transportation Department Permits](#)

Applications to the Chicago Department of Transportation for permits under its jurisdiction where the work type is ▶

[More View](#)

Best In The World 3	The main character deals with a rude customer.
Dr.Rooney's Office	We will be filming in the Waveland Parking lot with a car scene on 3600N Recreation Dr, Chicago IL 60613 from 6am-6pm.
Best In The World 2	Filming woman confront a man by her car. Parking production vehicles and Picture Cars.
My Apocalypse	Filming lead actor doing chores, making phone calls, etc. etc.
My Apocaplyse	INT. mostly --EXT. for B-Roll. We are filming the lead actor in his apartment -doing a monologue with flashbacks, etc.
My Apocaplyse	INT. mostly --EXT. for B-Roll. We are filming the lead actor in his apartment -doing a monologue with flashbacks, etc.
My Apocaplyse	INT. mostly --EXT. for B-Roll. We are filming the lead actor in his apartment -doing a monologue with flashbacks, etc.
Graffiti Trees	We are Columbia College Students filming exterior shots of the convenience store across the street. There will be no actors or traffic disruption.
IL Tourism Commercial	Filming Int/Ext of business to be featured in IL Tourism Commercial
Sanicole Works, LLC	Filming Near 4312 W. Carroll NO PARKING Saturday, November 4th 9A to 11:59P On Various Streets
IL Tourism Commercial	Filming Int/Ext of business to be featured in IL Tourism Commercial
Graffiti Trees	We are students from Columbia College Chicago shooting exterior shots of the storefront. We will not have any actors outside and will not cause any traff...
Cola Dremann	The full name for the film set is 'Cola Dremann's "Why Don't You Care?" Movement'. We're a Columbia College Chicago set, and we'll be filming next to a tr...
Best In The World 1	Filming indoor and outdoor.
The Premiere	Shooting scenes on the sidewalk for our film around 5 PM - 11 PM. The scenes involve characters standing and talking
SANICOLE WORKS, LLC.	Filming Near 8048 & 8236 S. Kedzie NO PARKING Friday November 3rd 8A to 6P On Various Streets
SANICOLE WORKS, LLC.	Filming Near 8048 & 8236 S. Kedzie NO PARKING Friday November 3rd 8A to 6P On Various Streets
SANICOLE WORKS, LLC.	Filming Near 8048 & 8236 S. Kedzie NO PARKING Friday November 3rd 8A to 6P On Various Streets
SANICOLE WORKS, LLC.	Filming Near 8243 S. Kedzie NO PARKING Thursday November 2nd 3P to Friday November 3rd 11:59P On Various Streets
SANICOLE WORKS, LLC.	Filming Near 8243 S. Kedzie NO PARKING Thursday November 2nd 3P to Friday November 3rd 11:59P On Various Streets



Filming Permits - Transportation Department

Based on [Transportation Department Permits](#)

Applications to the Chicago Department of Transportation for permits under its jurisdiction where the work type is ▶

More ▾

SANICOLE WORKS, LLC.	Filming Near 8243 S. Kedzie NO PARKING Thursday November 2nd 3P to Friday November 3rd 11:59P On Various Streets
Dr. Rooney's Office	
NFL End Zone	Filming b-roll GV's and links for our weekly show, NFL End Zone, which airs in the UK every week on Channel 5. Crew will consist of 1x talent, 1x camera o...
SANICOLE WORKS, LLC.	Filming Near 5642 S. Blackstone NO PARKING Thursday November 2, 2023 9A to 5P On Various Streets
SANICOLE WORKS, LLC.	Filming Near 5642 S. Blackstone NO PARKING Thursday November 2, 2023 9A to 5P On Various Streets
Stockton 10.30	
Stockton 10.30	
Edgewater Candles Documentary	Documentary focusing on Edgewater Candles, a local business.
Riverwalk	
Riverwalk	
Riverwalk	
Riverwalk	
The Premiere	Shooting scenes on the sidewalk for our film around 3 PM - 9 PM. The scenes involve characters standing and talking
Block party	Halloween block parade
The Premiere	Shooting scenes on the sidewalk for our film around 3 PM - 9 PM. The scenes involve characters standing and talking
Riverwalk	
Fuck Harold's	Filming one scene for a Student Short Film.
Riverwalk	

Filming Permits - Transportation Department

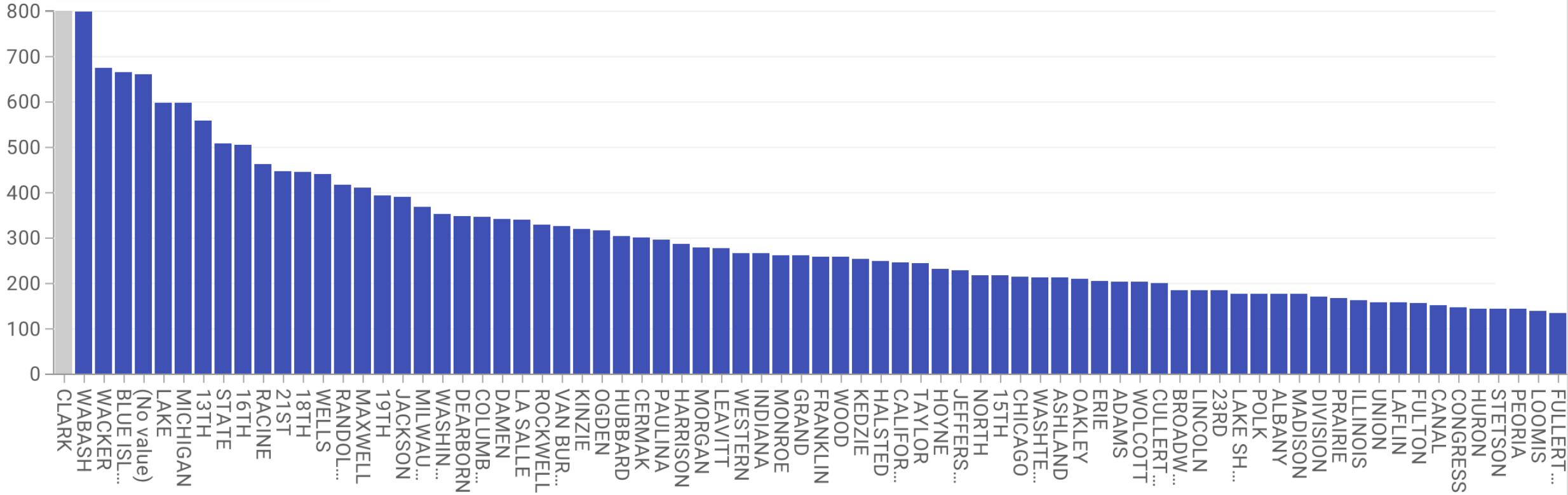
 Based on [Transportation Department Permits](#)

 Applications to the Chicago Department of Transportation for permits under its jurisdiction where the work type is 

PRIMARYCONTACTSTREET	PRIMARYCONTACTSTREET2	PRIMARYCONTACTCITY	PRIMARYCONTACTSTATE	PRIMARYCONTACTZIP
836 N. Neva Ave		Addison	IL	60101
1515 Broadway		New York	NY	10003
24700 McBean Pkwy		Santa Clarita	CA	91355
4902 N Magnolia Avenue	Unit 3	Chicago	IL	60640
4535 N. Milwaukee Ave.	Apt. 4B	Chicago	IL	60630
1104 S Wabash		Chicago	IL	60605
1104 S Wabash		Chicago	IL	60605
2000 S California Ave	1st Floor	Chicago	IL	60608
1104 S Wabash		Chicago	IL	60605
1 East Jackson Blvd.		Chicago	IL	60604
1 East Jackson Blvd.		Chicago	IL	60604
1 East Jackson Blvd.		Chicago	IL	60604
1 East Jackson Blvd.		Chicago	IL	60604
1 East Jackson Blvd.		Chicago	IL	60604
37 W Van Buren	Apt. 1609	Chicago	IL	60605
1325 w Wilson ave	1205	Chicago	IL	60640
666 W Oakdale Ave. 1F		Chicago	IL	60657
1 East Jackson Blvd.		Chicago	IL	60604

CLARK

801 Permit Applications



Click and drag to pan the chart

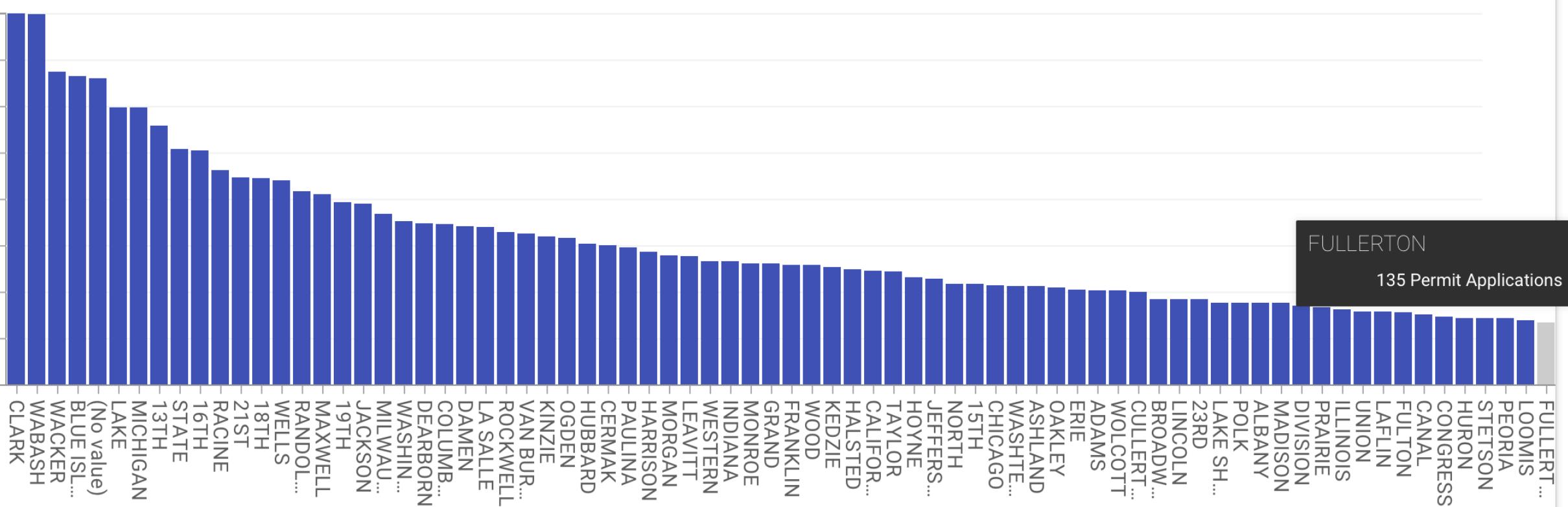


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•••



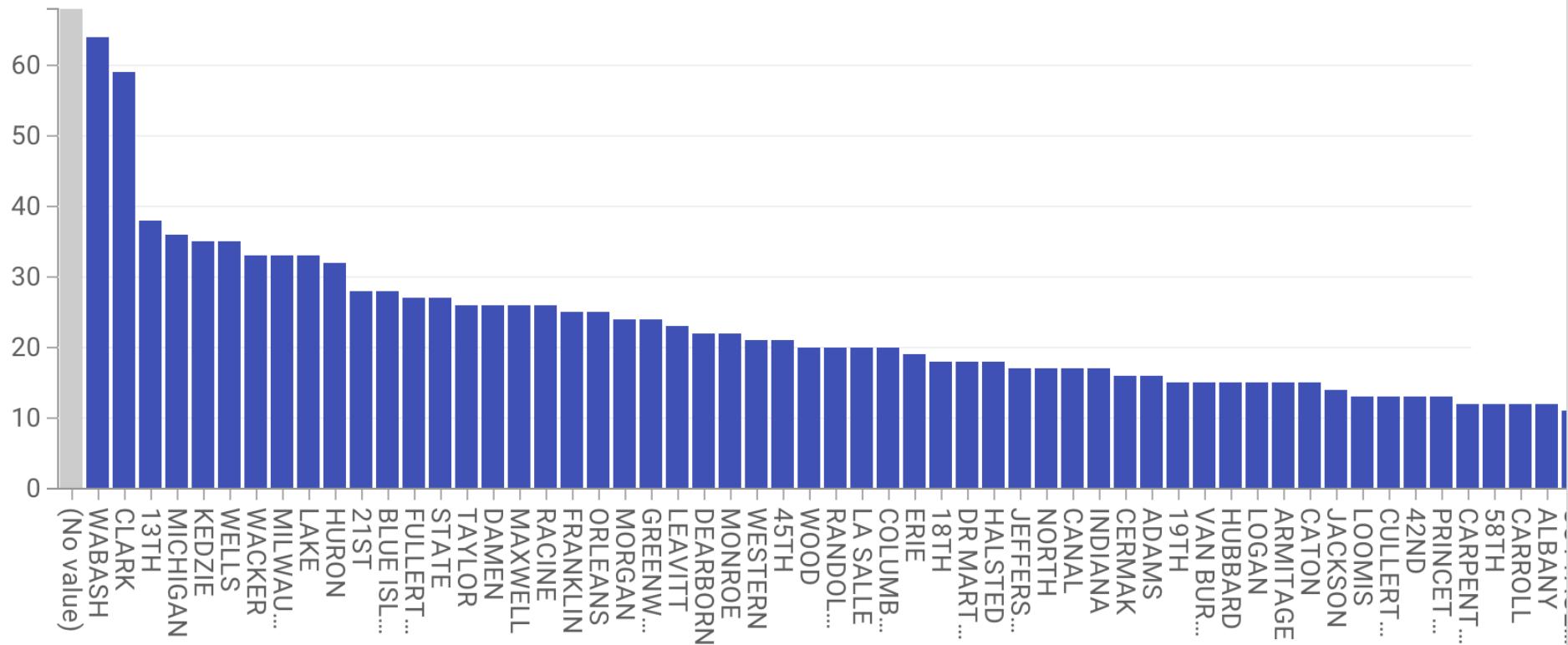
Click and drag to pan the chart

Add Filter

[Clear All](#)

(No value)

68 Permit Applications



Click and drag to pan the chart



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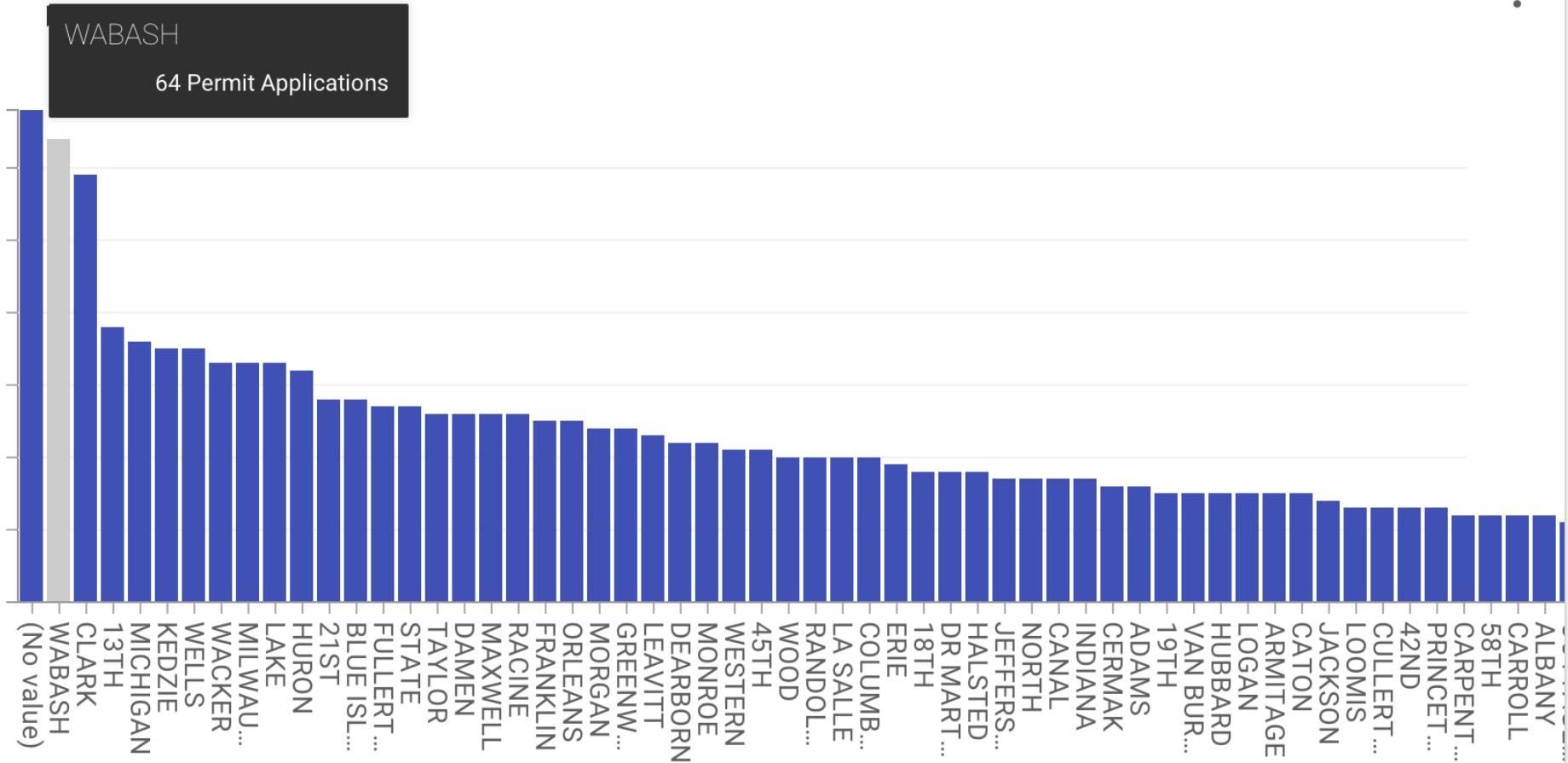
Add Filter

[Clear All](#)

APPLICATIONENDDATE

From 1/1/2023 to 12/31/20... ▾

3



Click and drag to pan the chart

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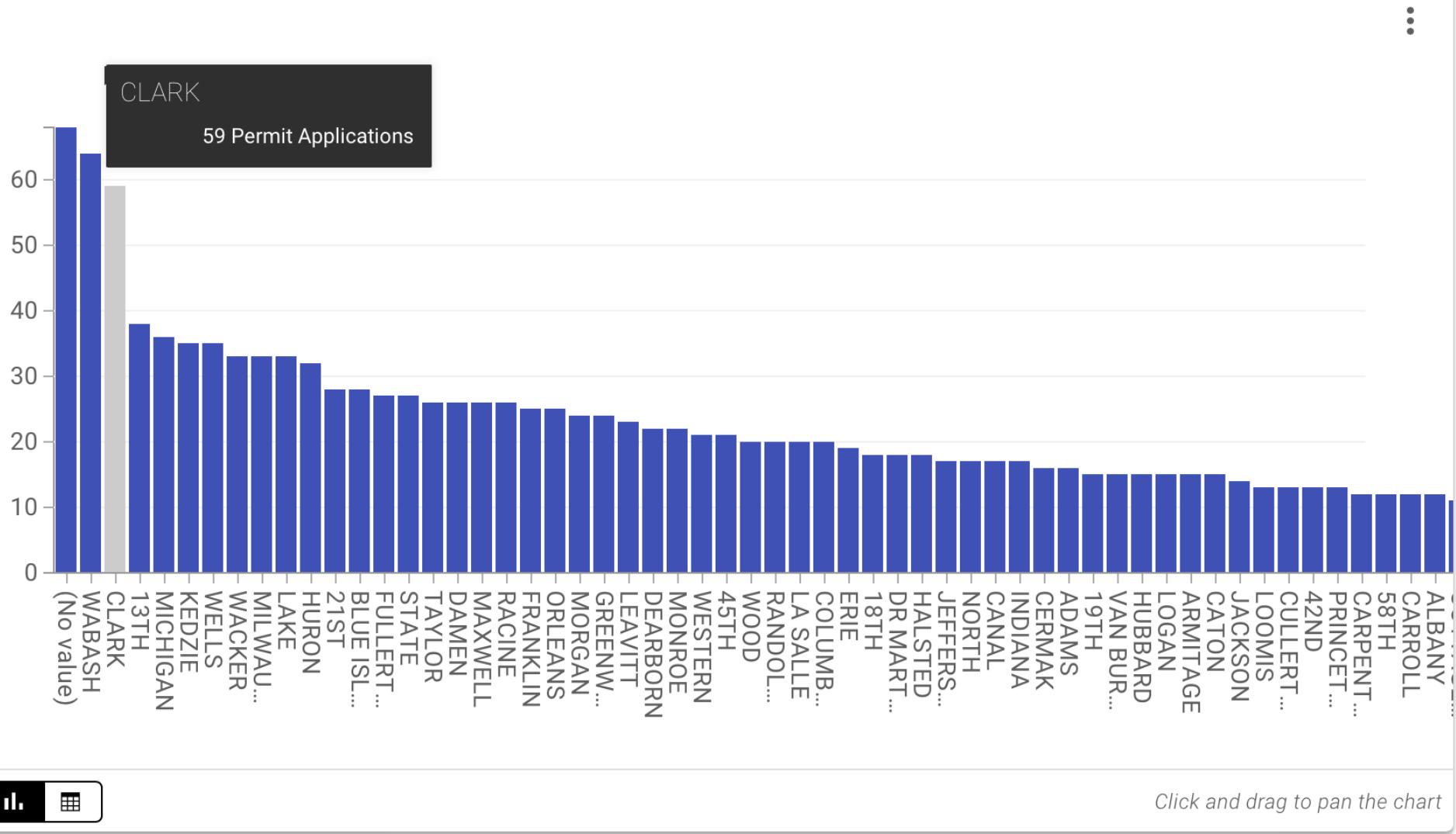
Add Filter

[Clear All](#)

APPLICATIONENDDATE

From 1/1/2023 to 12/31/20... ▾

10



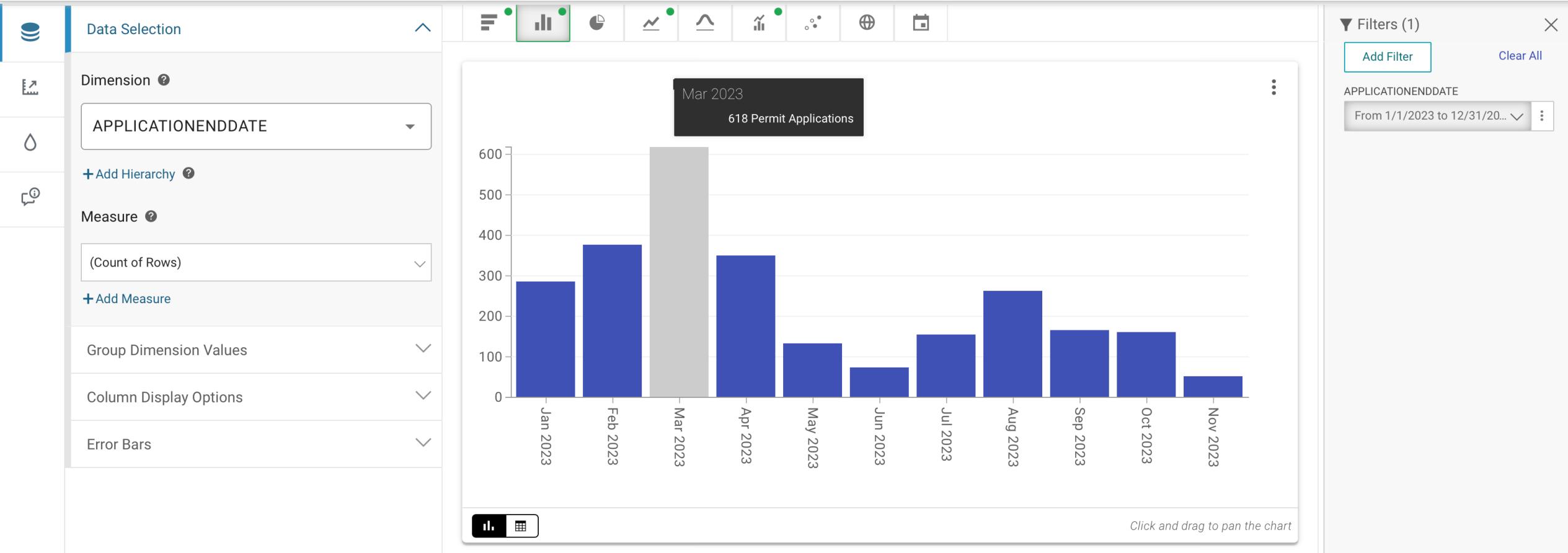
Click and drag to pan the chart

@AnnieTalvasto

@AdiPolak



Configure Visualization



Configure Visualization

The figure is a map visualization titled "Filming Permits - Transportation Department". The map shows the distribution of filming permits across the Chicago metropolitan area and surrounding suburbs. The permits are represented by orange points of varying sizes, indicating the number of permits issued at each location. The map includes labels for numerous towns and cities, such as Schaumburg, Elk Grove Village, Park Ridge, Itasca, Bensenville, Addison, Carol Stream, West Chicago, Lombard, Maywood, Brookfield, Warrenville, Downers Grove, Naperville, Woodridge, and Darien. The legend at the bottom right of the map indicates that point size corresponds to the number of permits.

Layer List

Filming Permits - Transportation Department

Data Selection

Geo Column: LOCATION

Resize Points by Value: None

Style by Value: None

Point Aggregation

Color

Point Size

Flyout Unit Label

Flyout Details

Advanced Options

Filters (1)

Add Filter

Clear All

APPLICATIONENDDATE: From 1/1/2023 to 12/31/2023

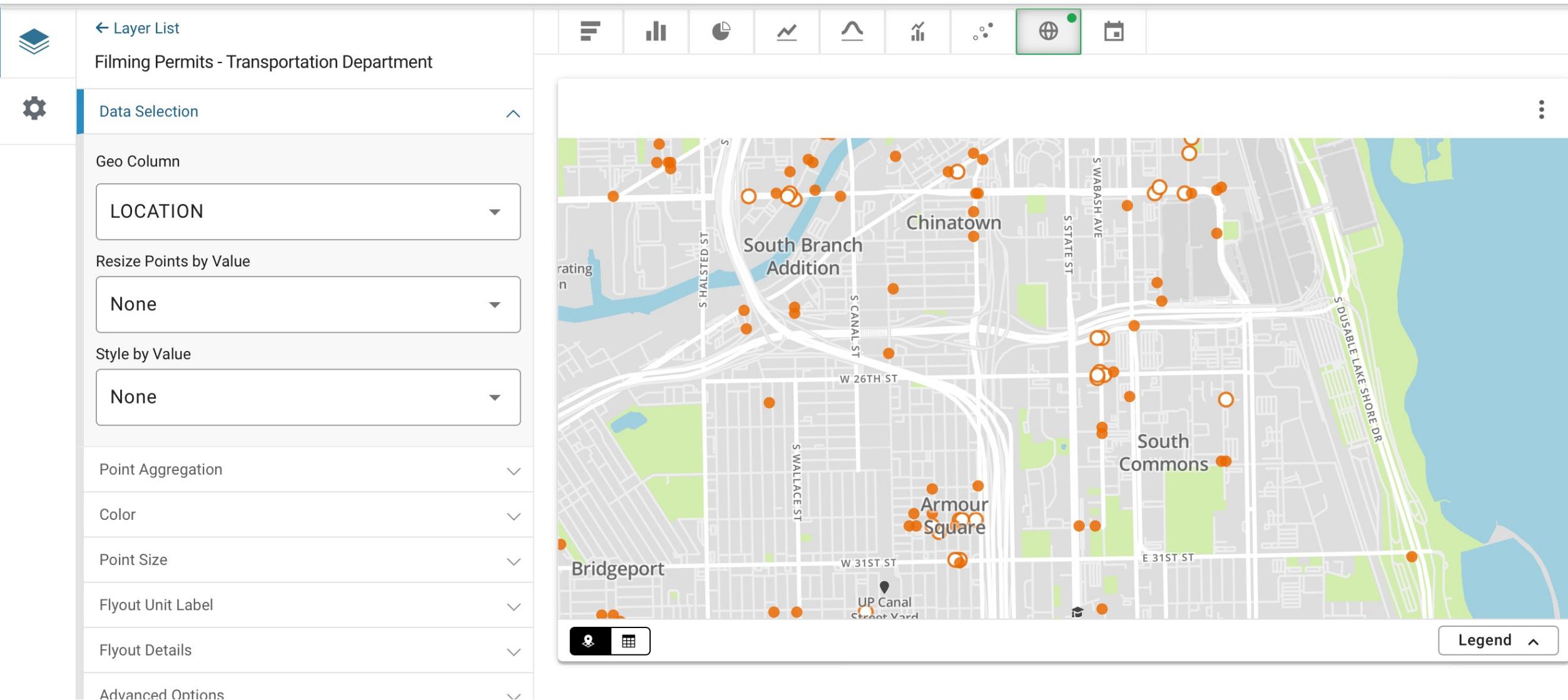
Legend

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@AdiPolak



Configure Visualization



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Configure Visualization

The chart displays the distribution of primary contact cities. The x-axis lists the cities, and the y-axis shows the count of rows for each city.

City	Count (Approx.)
Chicago	16,000
Beverly Hills	5,500
New York	3,800
North Hollywood	3,200
Burbank	2,800
Los Angeles	2,500
Brooklyn	1,800
Cuverville	1,500
Univers...	1,200
(No value)	1,000
Los Angeles	800
Beverly Hills	500
New York	400
North Hollywood	300
Burbank	200
Los Angeles	150
Brooklyn	100
Cuverville	80
Univers...	50
(No value)	30
Los Angeles	20
Brooklyn	10
Cuverville	5
Univers...	3
(No value)	2
Los Angeles	1

Click and drag to pan the chart

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Demo time:
Simple LLM





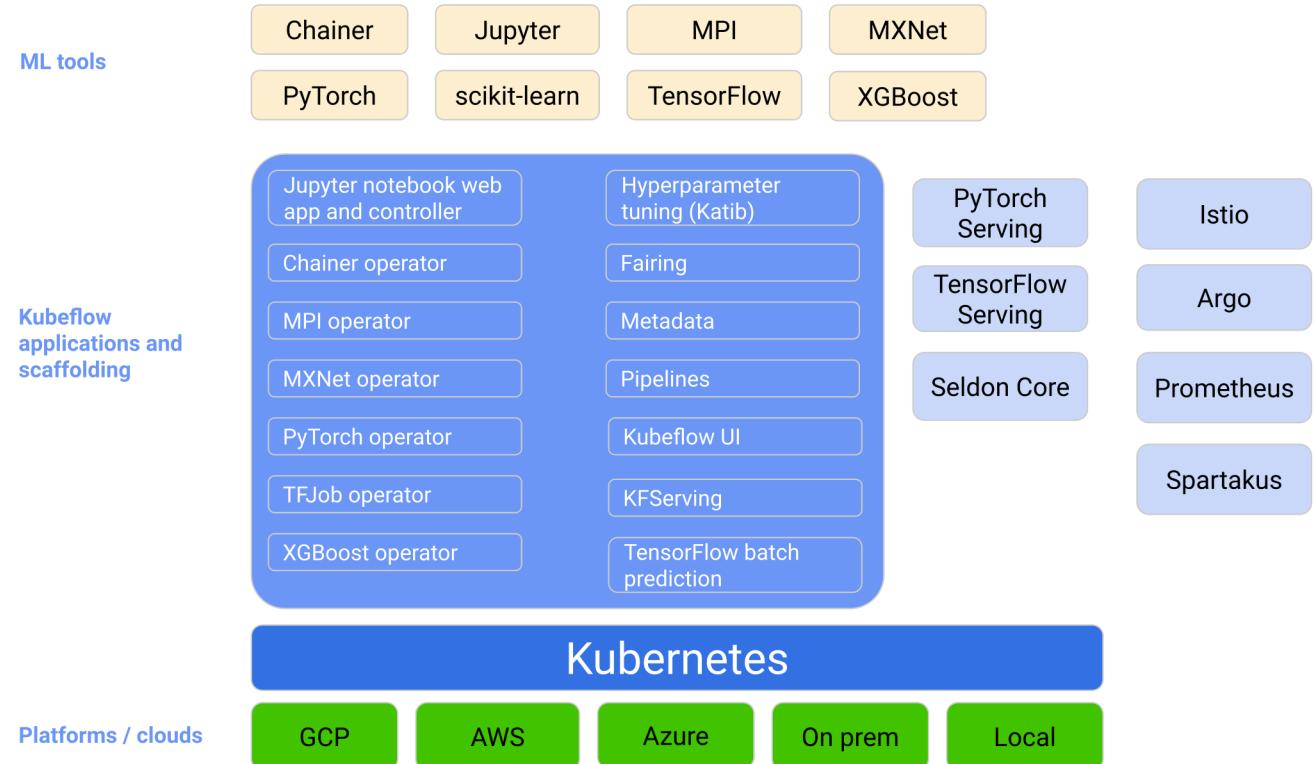
Open Source Stack for LLMs

- Secure gpu pools / hardware
- Open source models
 - llma2, Dolly, claud2, mpt-7b, falcon..
- LLM Starter pack k8s & docker
 - <https://github.com/cncf/llm-starter-pack>
- Huggingface
- LangChain
- Kubeflow / airflow / mlflow
- Data ..



What is Kubeflow?

- End-to-End ML workflow
- Scalability and resource management
- Reproducibility and collaboration



Source: <https://www.kubeflow.org/docs/started/architecture/>



Learn more

- Links and slides: github.com/annietalvasto
- Data: <https://data.cityofchicago.org/Community-Economic-Development/Filming-Permits-Transportation-Department/c2az-nhru>
- Practical MLOps by Noah Gift and Alfredo Deza (O'Reilly). Copyright 2021 Noah Gift and Alfredo Deza, 978-1-098-10301-9.
- Scaling Machine Learning with Spark by Adi Polak (O'Reilly Media, Inc.). Copyright 2023 Adi Polak, 978-1-098-106829
- Welcome + Opening Remarks: The State of Production MLOps in the Cloud Native... - Alejandro Saucedo
 - <https://www.youtube.com/watch?v=xymbp8RWaCQ&list=PLj6h78yzYM2M9oVaU3amsqL5RXUwcu>
- Kubeflow for Machine Learning • Holden Karau & Adi Polak • GOTO 2022
 - <https://www.youtube.com/watch?v=dUZ5TrSReZc&t>
- Kubernetes and MLOps for Scalable and Reproducible Generative AI – Annie Talvasto
 - <https://youtu.be/l1f4QdXz34g?si=8luLfyFwwivZXKjZ>

Thank you!
Q&A time



Please scan the QR Code above
to leave feedback on this session

