

Google Security, The Apache Software Foundation & Time Series Databases

Presented by:

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DEVFEST

2019

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#DevFest

CITY OF
Thunder Bay
Superior by Nature



About the Speaker

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Member of the Apache Software Foundation,
Release Manager for Apache SpamAssassin,
Director at the Dysautonomia Support Network,
Advisor to SecurityUniversity.edu and Virtru, and
Google G Suite TC, GDE & Ambassador.



<https://www.linkedin.com/in/kmcgrail>



2019



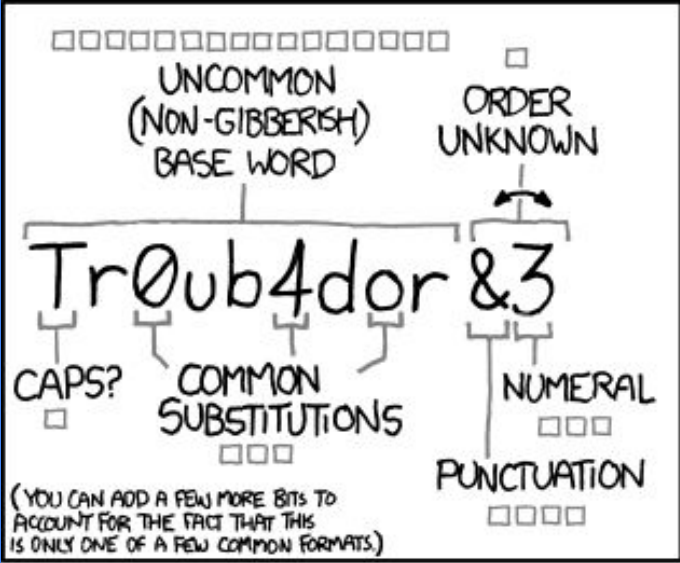

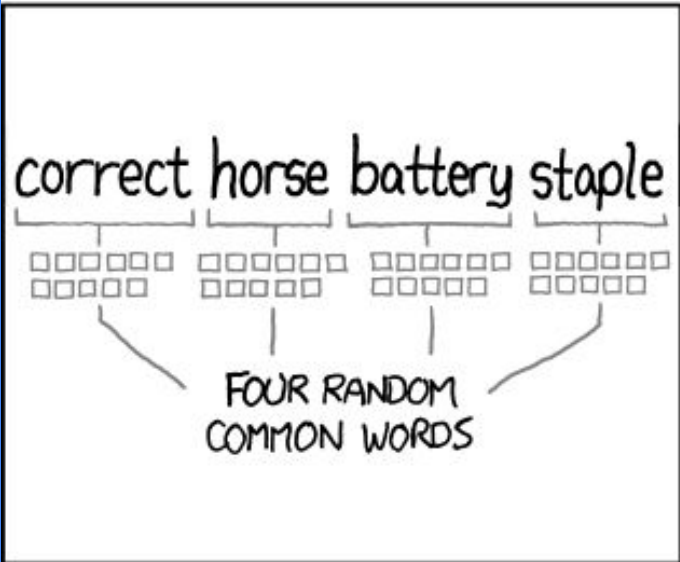
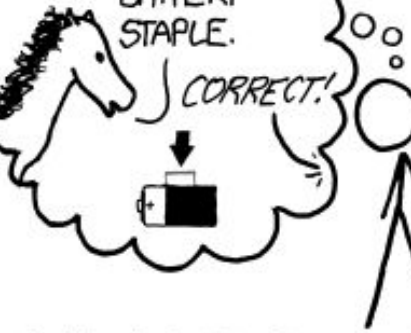
G Suite Security Tips



Passphrases not passwords

Google Cloud

Password Length is Better Than Password Complexity!!

 <p>UNCOMMON (NON-GIBBERISH) BASE WORD</p> <p>ORDER UNKNOWN</p> <p>Tr0ub4dor&3</p> <p>CAPS? COMMON SUBSTITUTIONS NUMERAL PUNCTUATION</p> <p>(YOU CAN ADD A FEW MORE BITS TO ACCOUNT FOR THE FACT THAT THIS IS ONLY ONE OF A FEW COMMON FORMATS.)</p>	<p>~28 BITS OF ENTROPY</p> <p>$2^{28} = 3 \text{ DAYS AT } 1000 \text{ GUESSES/SEC}$</p> <p>(PLAUSIBLE ATTACK ON A WEAK REMOTE WEB SERVICE. YES, CRACKING A STOLEN HASH IS FASTER, BUT IT'S NOT WHAT THE AVERAGE USER SHOULD WORRY ABOUT.)</p> <p>DIFFICULTY TO GUESS: EASY</p>	<p>WAS IT TROMBONE? NO, TROUBADOR. AND ONE OF THE 0s WAS A ZERO?</p> <p>AND THERE WAS SOME SYMBOL...</p>  <p>DIFFICULTY TO REMEMBER: HARD</p>
 <p>correct horse battery staple</p> <p>FOUR RANDOM COMMON WORDS</p>	<p>~44 BITS OF ENTROPY</p> <p>$2^{44} = 550 \text{ YEARS AT } 1000 \text{ GUESSES/SEC}$</p> <p>DIFFICULTY TO GUESS: HARD</p>	<p>THAT'S A BATTERY STAPLE.</p> <p>CORRECT!</p>  <p>DIFFICULTY TO REMEMBER: YOU'VE ALREADY MEMORIZED IT</p>

THROUGH 20 YEARS OF EFFORT, WE'VE SUCCESSFULLY TRAINED EVERYONE TO USE PASSWORDS THAT ARE HARD FOR HUMANS TO REMEMBER, BUT EASY FOR COMPUTERS TO GUESS.

“Verifiers SHOULD NOT require memorized secrets to be changed arbitrarily (e.g., periodically). However, verifiers SHALL force a change if there is evidence of compromise of the authenticator.”

SP 800-63B Section 5.1.1.2 paragraph 9
Don't Require Password Changes



NIST
**National Institute of
Standards and Technology**
U.S. Department of Commerce

Use Unique Passwords!!

havebeenpwned.com

Base Password + Cipher (pig latin/Caesar/middle letters of site)

';--have i been pwned?



**You can't
uncompromise
biometrics.**

82%

Reduction in support costs

\$16

Cost for Thetis FIDO U2F Key on Amazon



Use MFA

0

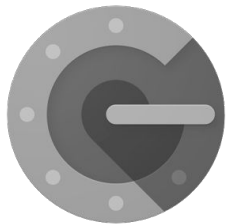
Number of exploits reported by Google Employees since they switched to keys

\$1,000

The hourly rate for a 3 person incident response team from PCCC

Use Google Authenticator

“Two-factor authentication (2FA) that uses SMS or phone calls is only slightly better than no 2FA at all.”



Google Auththicator

Dan Goodin
Ars Technica



Reset your Google Account password

You just entered your Google Account password on a sign-in page that's not Google's. Immediately reset your password to protect your account. And please make sure you don't reuse your password for other apps and sites. [Learn more](#)

Reset Password

Ignore this time

Always ignore for this site

Password Alert

Also alerts you about pages that are impersonating a Google sign-on page!

Hackers Love OOM

☐ Vacation responder off

☒ Vacation responder on

First day:

☐ Last day:

Subject:

Message:

Sans Serif ▾ | T ▾ | **B** *I* U A ▾ | ↻ |  |  ▾ |  |  |  |  |  |  |  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Here's why...

☐ Vacation responder off

☒ Vacation responder on

First day: August 3, 2018

☐ Last day: (optional)

Subject:

Message:

Sans Serif

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« Plain Text

Hi, I am out of the country, please come rob my house! Oh and now is a great time to try and attack my accounts and things since I might not see the notices. And Bob might be a great guy to send an email impersonating me.

☐ Only send a response to people in my Contacts

☐ Only send a response to people in PCCC Document Share

Watch out for Impersonators!



Phil Steitz via [apache.org](#)

to Kevin ▾

Okay. I need you to set up a same-day payment to the account details below

Amount \$19,840

Bank Name: Wells Fargo

Name on Account

Account Number

Routine Number

Address: [475 6th](#)

E-mail me the p

Phil Steitz

[executive.office2@zoho.com](#)



Contact info

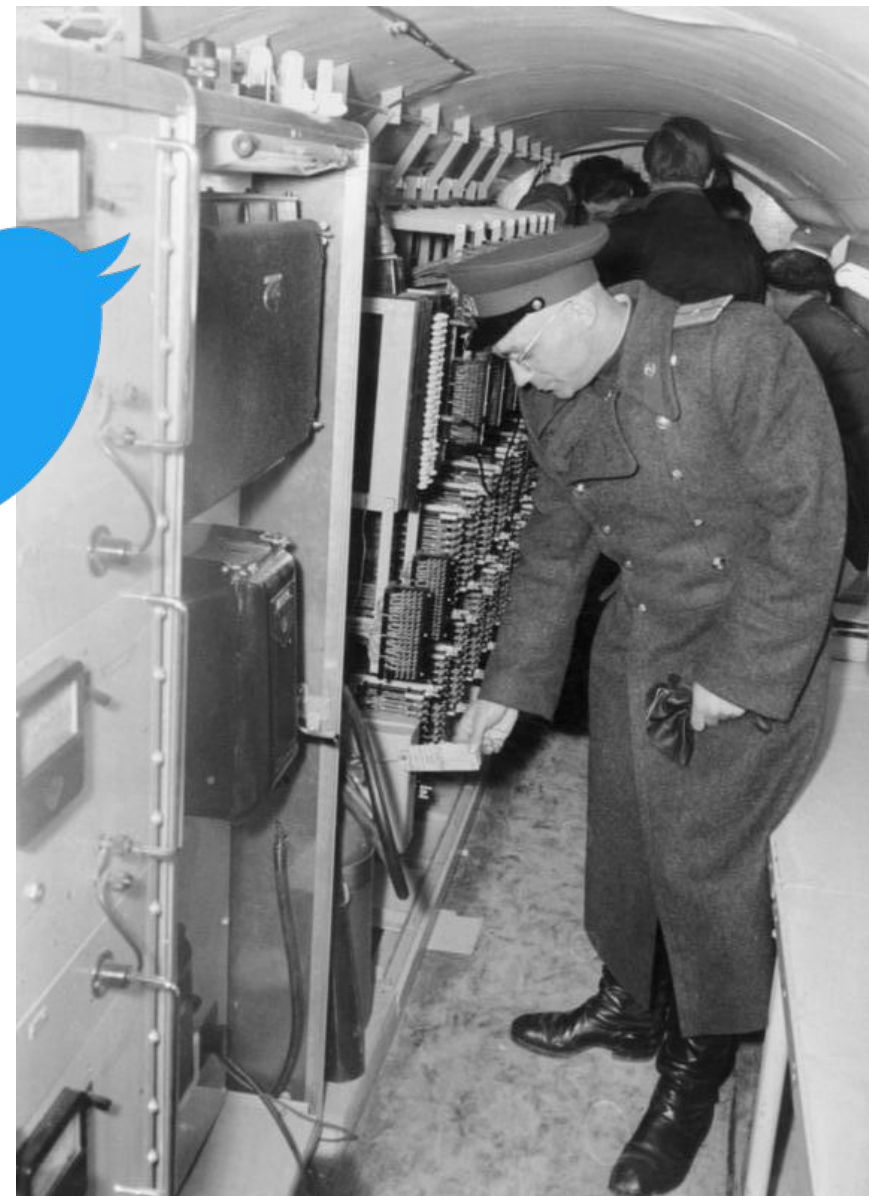
Emails



Live Demo:
This Does Not Exist!

Social Media is a Goldmine

Be sensitive about what you post. Birthdays, parents, addresses, pets, graduations, etc. it all adds up! And it's all archived somewhere...



Bundesarchiv, Bild 183.37605-0003
Foto: Junge, Peter Heinz | 24. April 1956

Quis Custodiet Ipsos Custodes?

USENIX / Systems Administrator's Code of Ethics

<https://www.usenix.org/system-administrators-code-ethics>



Dad-isms

If you aren't paying for it, you ARE the product.

Too good to be true? It probably is...

“Invoice” Scams

“This notice is not a bill...”



Domain Name Expiration Notice

visit us at www.idns.ac

As a courtesy to domain name holders, we are sending you this notification of the domain name registration that is due to expire in the next few months. When you switch today to Internet Domain Name Services, you can take advantage of our best savings. Your registration for: [REDACTED] will expire on **December 4, 2018**. Act today!

Domain name: [REDACTED]
Reply Requested By: September 24, 2018

You must renew your domain name to retain exclusive rights to it on the Web, and now is the time to transfer and renew your name from your current Registrar to Internet Domain Name Services. Failure to renew your domain name by the expiration date may result in a loss of your online identity making it difficult for your customers and friends to locate you on the Web.

Privatization of Domain Registrations and Renewals now allows the consumer the choice of Registrars when initially registering and also when renewing a domain name. Domain name holders are not obligated to renew their domain name with their current Registrar or with Internet Domain Name Services. Review our prices and decide for yourself. You are under no obligation to pay the amounts stated below, unless you accept this offer. **This notice is not a bill**, it is rather an easy means of payment should you decide to switch your domain name registration to Internet Domain Name Services.

Term	Period covered	Price
1 year	Until -- Dec 4, 2019	\$45.00
2 years (Recommended)	Until -- Dec 4, 2020	\$80.00 (save \$10)
5 years (Best Value)	Until -- Dec 4, 2023	\$180.00 (save \$45)

The following names are currently available for you to register and secure, protecting your domain name from being duplicated.

Available Domains	Period covered	Price
[REDACTED]	2 Years	\$80.00
[REDACTED]	2 Years	\$80.00

For a complete list of our terms and conditions, please visit www.idns.ac/tos

Transfer and renew your domain name online at www.idns.ac 24 hours a day, 7 days a week.

Please detach this stub and include it with your payment.

Check the appropriate boxes of the Domain Names you would like to order.

Expiration Date	Reply Requested By	Renewal Term	Payment	(✓)
December 4, 2018	September 24, 2018	1 Year	\$45.00	<input type="checkbox"/>
		2 Year	\$80.00	<input type="checkbox"/>
		5 Year	\$180.00	<input type="checkbox"/>

Available Domain Names (Optional)

1 Year	\$45.00	<input type="checkbox"/>
2 Year	\$80.00	<input type="checkbox"/>
5 Year	\$180.00	<input type="checkbox"/>
1 Year	\$45.00	<input type="checkbox"/>
2 Year	\$80.00	<input type="checkbox"/>
5 Year	\$180.00	<input type="checkbox"/>

Total Amount

If paying by credit card, please enter your information below:

Card Number:

Expiry: /

Please provide a valid email address on the above line



"Invoice" Scams

"This is an advertisement..."



Warranty Services
Extended Coverage Department



Owner ID #: CIL9696331

Contact Phone: 1-877-324-0916

Vehicle Make: HONDA, NISSAN, TOYOTA

Program Term Deadline: 7/3/2018

Call to verify the above information

Read below for more information



IMMEDIATE RESPONSE TO THIS NOTICE REQUESTED

*****AUTO**SCH 5-DIGIT 22031

Mr. McGrail

6113



IMMEDIATE RESPONSE TO THIS NOTICE REQUESTED

Owner ID #: CIL9696331

Coverage Status: AVAILABLE

Program Term Deadline: 7/3/2018

Makes: HONDA, NISSAN, TOYOTA

Attention: Mr. McGrail

Our records indicate that you have not contacted us to have the vehicle service contract for your HONDA, NISSAN, TOYOTA Updated. You are receiving this notice to ensure no lapse in warranty coverage. Warranty expiration is based on the mileage and age of your HONDA, NISSAN, TOYOTA Call now to update your coverage.

Please Call: 1-877-324-0916

Para Espanol: 1-877-282-9764

By neglecting to replace your coverage you will be at risk or being financially liable for any and all repairs after your factory warranty expires. However, you still have time left to activate your service contract on vehicle before it's too late. No vehicle inspection will be required.

Your file on this vehicle will be deleted and you may no longer be eligible for this offer regarding service coverage after 7/3/2018

Personalized Website	http://CIL9696331.autorepairnetwork.info
----------------------	---

SUMMARY OF TERMS

0%	1.5%	2.75%	3.75%	4.5%	7.85%	9.25%	11.99%
APPROVED	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Coverage Explanation	
REQUESTING	Platinum Option: Engine, Transmission, Transfer Unit of 4x4, Drive Axle Assembly, Front End and Rear Suspension, Steering, Air Conditioning Unit, Electronics, Seals, Gaskets, Brake System, and Most mechanical Parts.
1. EXTENSION THROUGH 2023	
2. UP TO OR AN ADDITIONAL 100K MILES	
3. PLATINUM / POWERTRAIN	You may have been selected to receive this special limited time offer from Warranty Services Vehicle Division because of information in your public record consumer auto data file. Final acceptance is subject to your ability to meet our full eligibility requirements. This is an advertisement to obtain coverage.
PHONE: 1-877-324-0916	Call No Later Than: 7/3/2018

Operating Hours: Monday - Friday 8:00am to 7:00pm CST & Saturday 9:00am - 2:00pm CST

Trick of the Day: The power button for the Pixelbook is a built-in U2F security key.



chromebook



“The Chromebook is a real challenge;
full encryption and cheap.
The two worst fears for security and
digital forensics.”

Amber Schroader
Paraben Corporation



Google Cloud

The Apache Software Foundation



Who is the ASF?

The Apache Software Foundation is a 501(c)(3) Charity often referred to as just Apache or the ASF.

501(c)(3) Charity not a 501(c)(6) Trade Organization

We're known for the HTTP server and the Apache Software License.



2019



What is the ASF's Mission?

To provide software for the public good.

*We do this by providing services and support
for many diverse software project
communities of individuals AT NO CHARGE.*



2019



The Apache Software License

The ASLv2 is known for its permissive, business-friendly stance with patent grants and without copyleft provisions.



2019



Powered by Apache

80% of the world's websites use our software

Every Smartphone in the world uses our software

Every plane in US airspace is tracked w/our software



2019



Projects.Apache.org & The Incubator

There are currently 388 open source initiatives at the ASF:

- 201 committees managing 334 projects

- 5 special committees

- 49 incubating podlings



Quiz Break



2019



Quiz - Part A

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2019



Quiz - Part B

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Quiz - Part C

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Inclusion

 APACHE **MERITOCRACY**

 APACHE **APACHE.org**

 APACHE **do I.T. like a girl**

 APACHE **APACHE.org**

Inclusion

Merit does NOT depend on Age, Sex, Religion, Ethnicity, Race, Country of Origin, Sexual Preference, Social Status, Income Level, Lineage, and/or Physical / Cultural Traits*.

* Bonus points if you read Terry Pratchett or can code in Iambic Pentameter.
We also take into account if you are a cat person or a dog person.

Inclusion is Important

Community Over Code

Fix Diversity with Inclusion

Filling the Pipeline is just a Start!



Applied Behavior Analysis

DO NOT FEED

THE ENERGY CREATURE

Source: Tim Freeman, 28 May 1996

<http://www.cryonet.org/cgi-bin/dsp.cgi?msg=6284>



2019



Look for Common Ground

Venn Diagrams



Talking Across Languages

Use a tool like Google Translate

Translate it into one language and then translate that into the next language

Progress through 4-5 languages.

Don't translate back to your original language between other languages

Translate back to the original language.

If some of the text doesn't make sense, it might cause confusion in some languages.

Thanks to Sarah Kiniry of cPanel for the original idea!



2019



English Spanish French English - detected ▼



English Spanish Danish ▼

Translate

Use a tool like Google Translate
Translate it into one language and then translate that into the next language
Progress through 4-5 languages.
Don't translate back to your original language between other languages
Translate back to the original language.
If some of the text doesn't make sense, it might cause confusion in some languages.



338/5000

Use una herramienta como Google Translate
Traducirlo a un idioma y luego traducirlo al siguiente idioma
Progreso a través de 4-5 idiomas.
No traducir a su idioma original entre otros idiomas
Volver a traducir al idioma original.
Si parte del texto no tiene sentido, podría causar confusión en algunos idiomas.



Suggest an edit

English Spanish French Spanish - detected ▼



Korean Spanish Chinese (Simplified) ▼

Translate

Use una herramienta como Google Translate
Traducirlo a un idioma y luego traducirlo al siguiente idioma
Progreso a través de 4-5 idiomas.
No traducir a su idioma original entre otros idiomas
Volver a traducir al idioma original.
Si parte del texto no tiene sentido, podría causar confusión en algunos idiomas.



309/5000

使用Google翻译等工具
将其翻译成一种语言，然后将其翻译成下一种语言
通过4-5种语言取得进展。
不要在其他语言中翻译成您的原始语言
翻译回原始语言。
如果部分文本没有意义，可能会导致某些语言混淆。



Suggest an edit

Shìyòng Google fānyì děng qōngjù



2019



English Spanish French Chinese - detected ▼



Korean English Chinese (Simplified) ▼

Translate

使用Google翻译等工具
将其翻译成一种语言，然后将其翻译成下一种语言
通过4-5种语言取得进展。
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翻译回原始语言。
如果部分文本没有意义，可能会导致某些语言混淆。|



101/5000



Use tools like Google Translate
Translate it into a language and then translate it into the next language
Progress through 4-5 languages.
Don't translate into your original language in other languages
Translate back to the original language.
If some of the text is meaningless, it may cause some language confusion.



Suggest an edit



2019



Gender Neutral (Nick)Names

Sam vs Samantha

Pros & Cons

Shannon Faulkner

Use an Alias

Avoid Cultural Pitfalls

<https://www.hofstede-insights.com/>

Talk to Cultural Friendlies



2019



Communications is Key

Watch for regional confusions!

Example 1: Tabling items

Example 2: Whip Vote

Example 3: Endowment: what is it?

Example 4: Ich bin ein Berliner (Pfannkuchen?)





Oddest Resume Entry: Professional Livestock Artist

Feb 1891 Ambassador Dodd refused to Paint the VT President's Cow The Garden of Beasts by Erik Larson

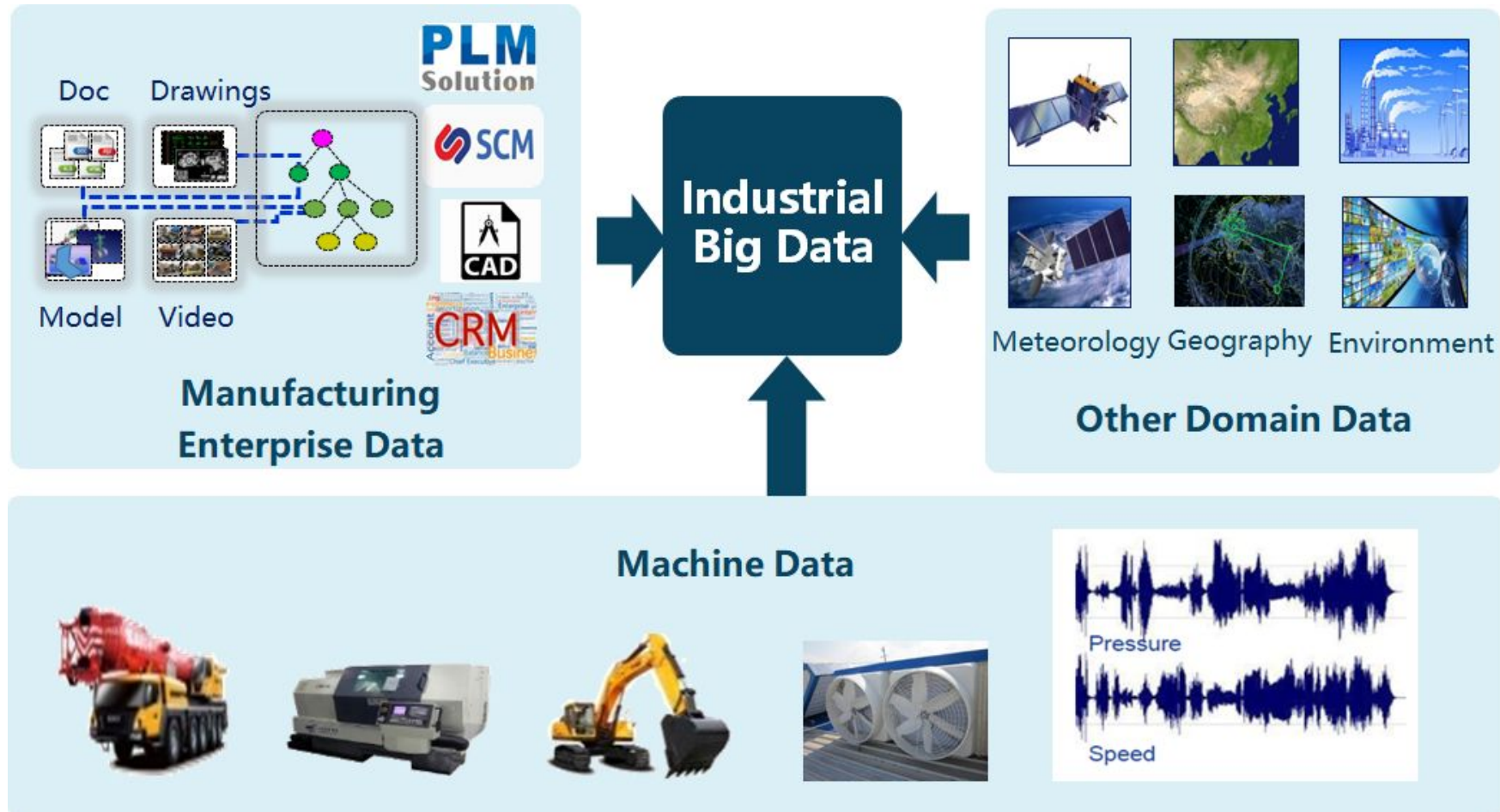


2019



What is a Time Series Database?

Machine Data



Big Data

“Big data is data sets that are so voluminous and complex that traditional data-processing application software are inadequate to deal with them. “ Wikipedia
Apache has 48 projects under Big Data!



2019



Apache Hadoop

Quiz: What's in a name?

Quiz: Why did they really call it Big Data?



Challenges with Machine Data

Produce Data 7*24
with High Frequency
and Large Volume



Big Data

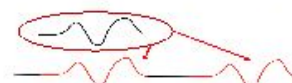
50Hz, 500points/machine,
20K wind-turbines machines,
totally up to 500 million points/sec

□ Feature of Data Ingestion

- Out-of-order sometimes
- Sparse Table
(different machine has different sensors)

□ Feature of Data Query

- Time Dimension is always accessed
- Aggregation is the first-class citizen
- Time-series-specific query and analysis



□ Challenges

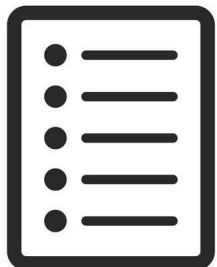
- Large Volume
- High Throughput
- Low Cost
(historical data)
- Low Latency for Query
- Fast Aggregation
- Query-Analysis hybrid workloads

The Solution

Apache IoTDB (Incubating)



Apache IoTDB Features



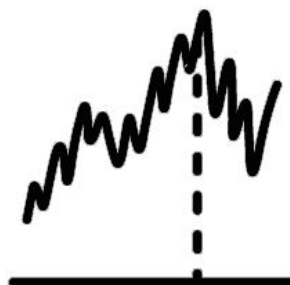
Persist data efficiently

- Millions points ingestion per sec per node
- Tens of millions of time series



Query data with low latency

- Efficiently filter data: millions of points per sec
- Aggregation: tens of ms latency on billions of points



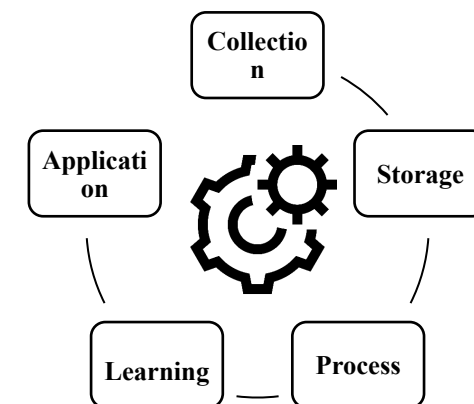
Exclusive operations of time series

- Segmentation
- Representation
- Subsequence matching
- Time-frequency transform
- Visualization



Integration with existing ecosystem

- Kafka
- MatLab
- Spark
- MapReduce
- Grafana



Cover the life cycle of data

- Connecting Edge to the Cloud
- Powerful query engine
- User Friendly analytics

How Does it Do This?

IoTDB

Efficiently operate on time series data from multiple TsFiles, including: CRUD and advanced queries like: max, min, avg and temporal alignment

TsFile

Time series data files: high-tech write, high compression ratio, support for simple query
Simply put, **TsFile is a zip file for time series data.**

Suitable for embedded devices!

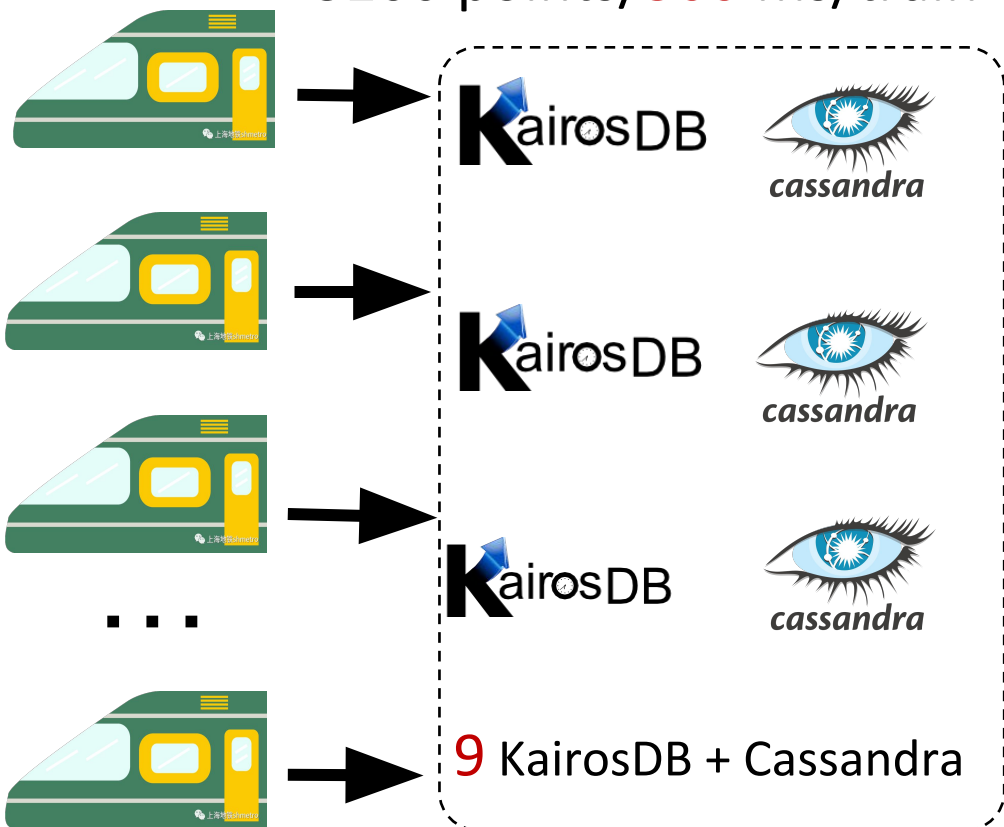


2019



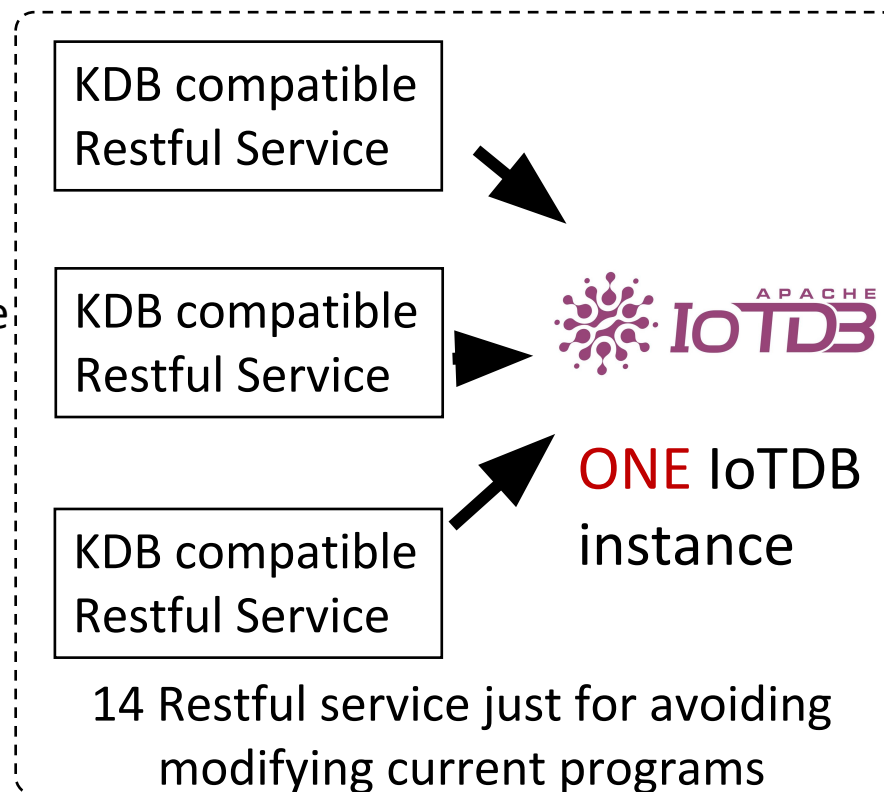
Example: Shanghai Metro Monitoring

3200 points/**500** ms/train



144 trains

3200 points/**200** ms/train



300 trains

414 Billion
data points
per day
just using
ONE IoTDB
instance

$$300 \times 3200 \times 5 \times 86400 = 414,000,000,000$$

Join Apache IoTDB

- Mail list:

- subscribe:

dev-subscribe@iotdb.incubator.apache.org

- discussion: dev@iotdb.apache.org

- bug report:

<https://issues.apache.org/jira/projects/IOTDB/issues/IOTDB>

- Website: <https://iotdb.apache.org>

- Ecosystem target:



IoTDB v0.8.0 is released! (the first Apache release version)

Thanks!

Image Credits:

KAM photo taken by Ted King, used with permission.

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Operation Gold Bundesarchiv, Bild 183-37695-0003 / Junge, Peter Heinz / CC-BY-SA 3.0

Company Logos are Brand Resources of their Respective Companies

VT Logo & Mystery Machine images used under fair use guidelines.

Thanks to:

Jianmin Wang for lending some of his slides, Xiangdong Huang for his help, the School of Software at Tsinghua University, and everyone working on the Apache IoTDB project!



Kevin A. McGrail

www.linkedin.com/in/kmcgrail



2019



More Time?

https://docs.google.com/presentation/d/183Lwl0jbBxq4lpBMg33rPHMDyopYIK5y5VckM8rE55U/edit#slide=id.g629dd5ae0b_2_1040



2019

