LOGICALIS

Business and technology working as one

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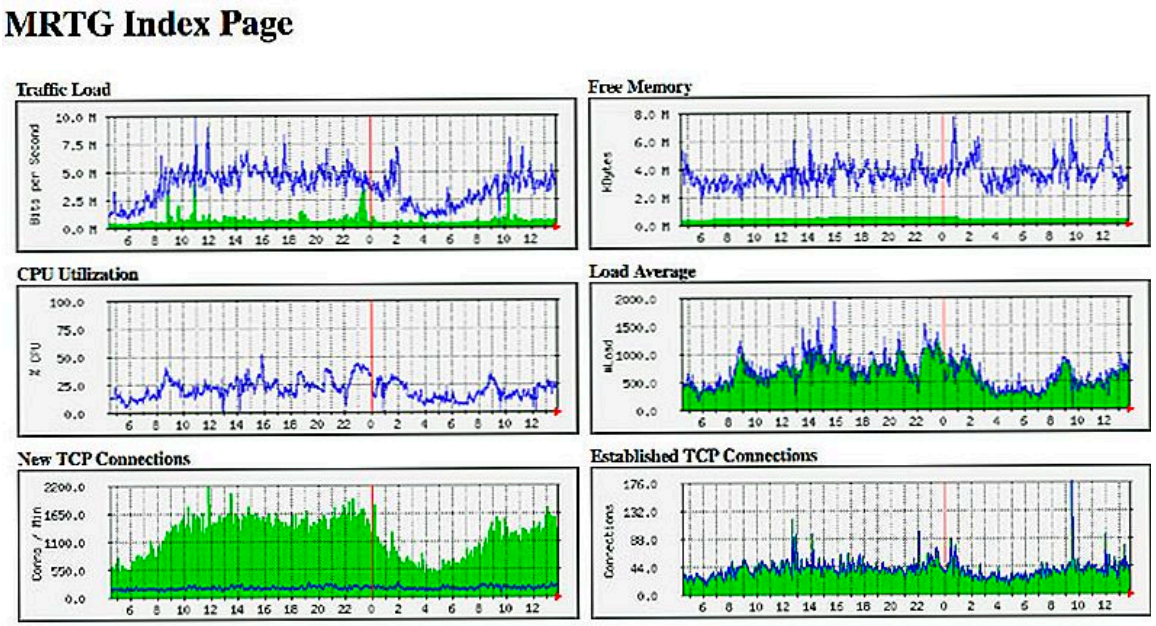
Telegraf, InfluxDB, Grafana Training

Handout, Lab

- 課程講義：cutt.ly/tig-lab2
- GitHub: https://github.com/tiunn/tig-labs-2
- Grafana Demo:
  - Grafana: http://grafana.hlchang.com
  - Influxdb: http://influxdb.hlchang.com
  - User: labusers
  - Password: grafanalab
- Lab 影片：http://www.youtube.com Warren Chang 頻道

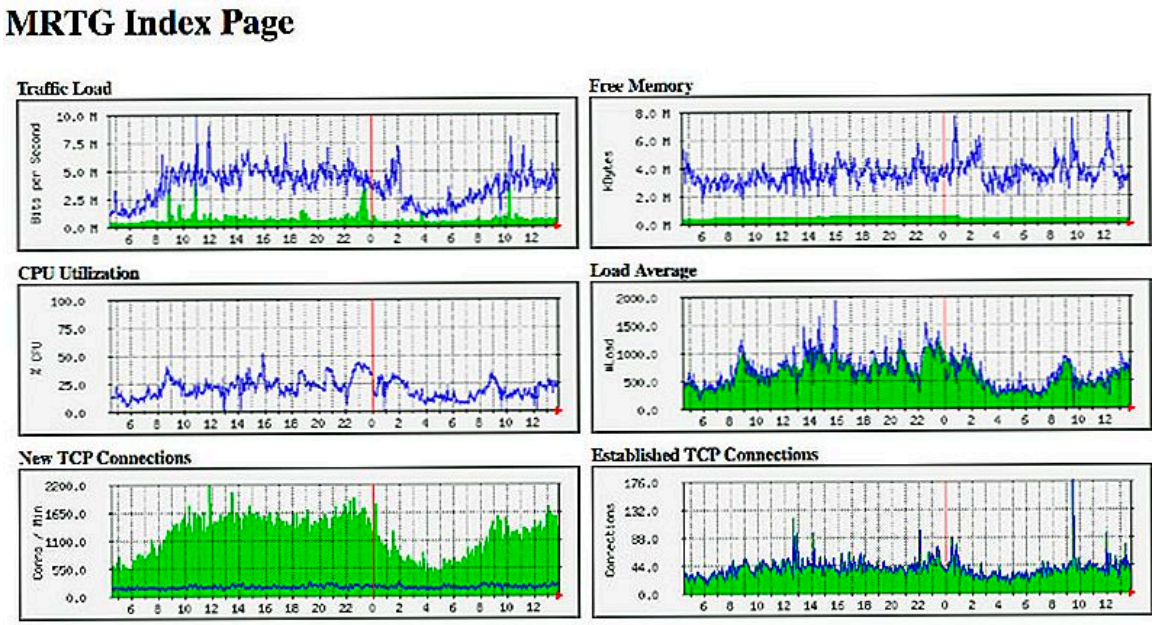
Still Using MRTG?

- Simple all in one SNMP monitoring software
  - Send SNMP requests
  - Store replies into text-based database
  - Generate images and HTML pages
- Measures two values (input / output)
- Collects data every five minutes
- Static pages
- RRDTools, Cacti



Why should not use MRTG anymore

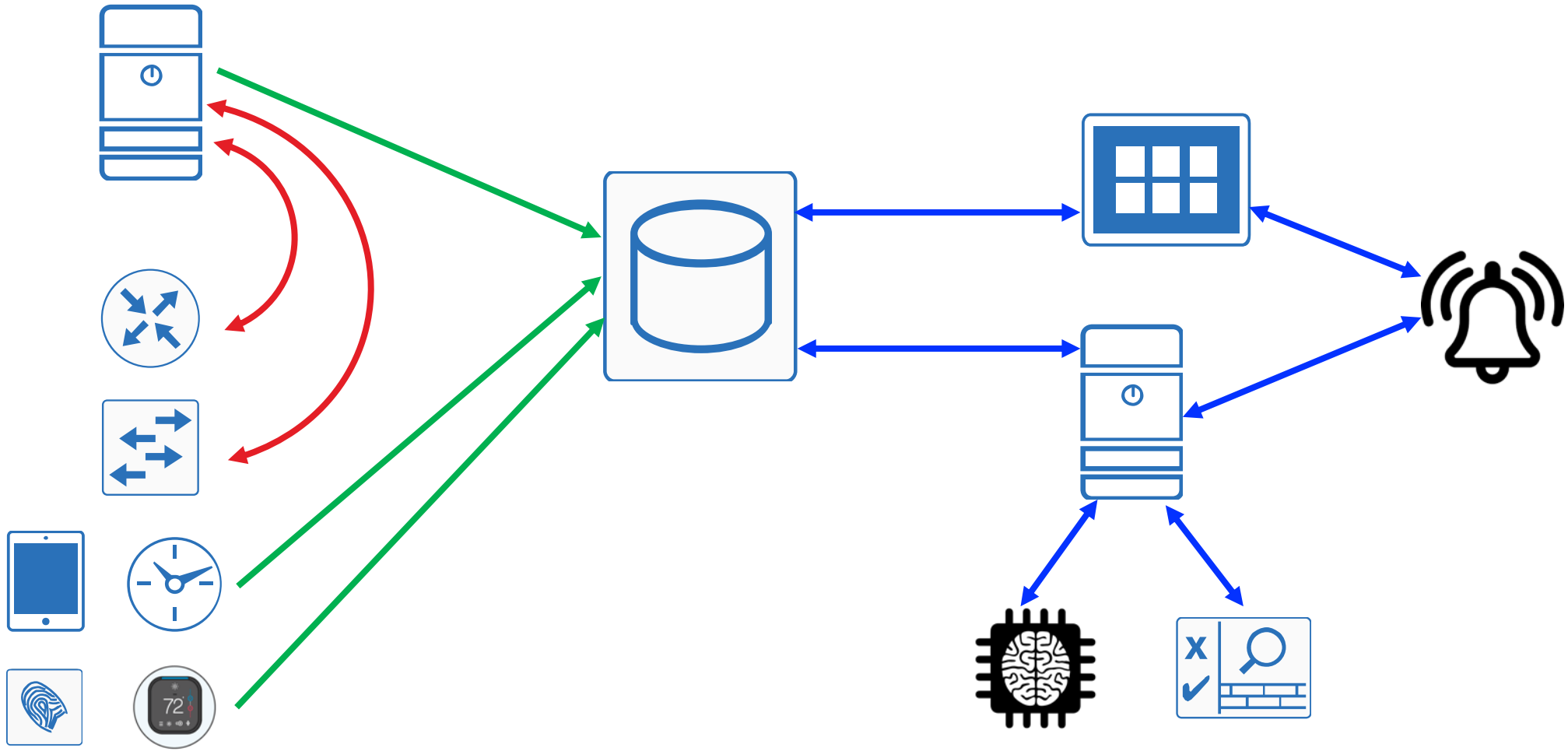
- Pull-based
- Mainly SNMP, 2-D data
- Not scalable
- Static image, web page
- Five minutes interval
- Difficult to customize
- No modern alert mechanism
- No distributed databases



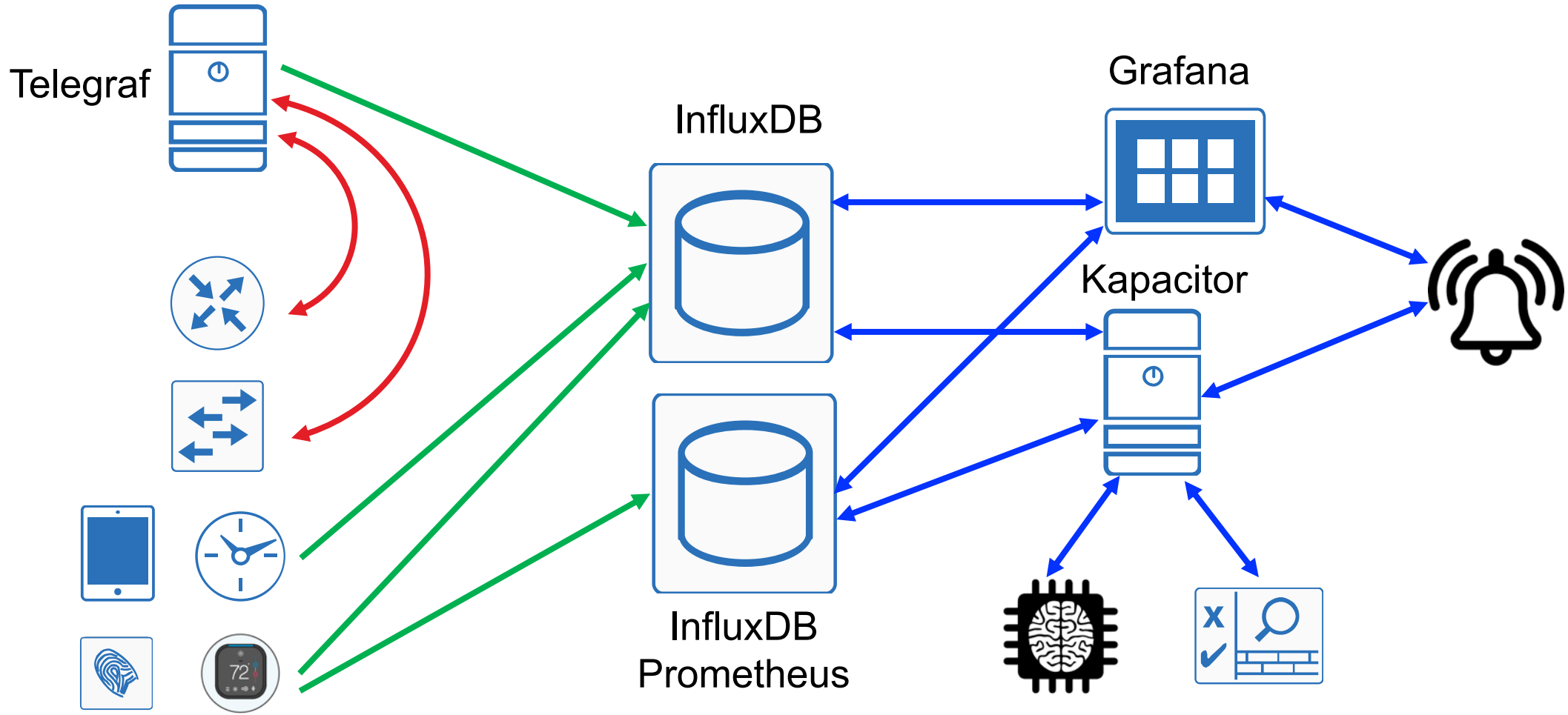
What we need

- Collect data
- Store and process data
- Visualize data
- Monitoring and alert
- Telemetry data more than SNMP
  - What is telemetry data?
  - Getting more important
  - Big Data to AI

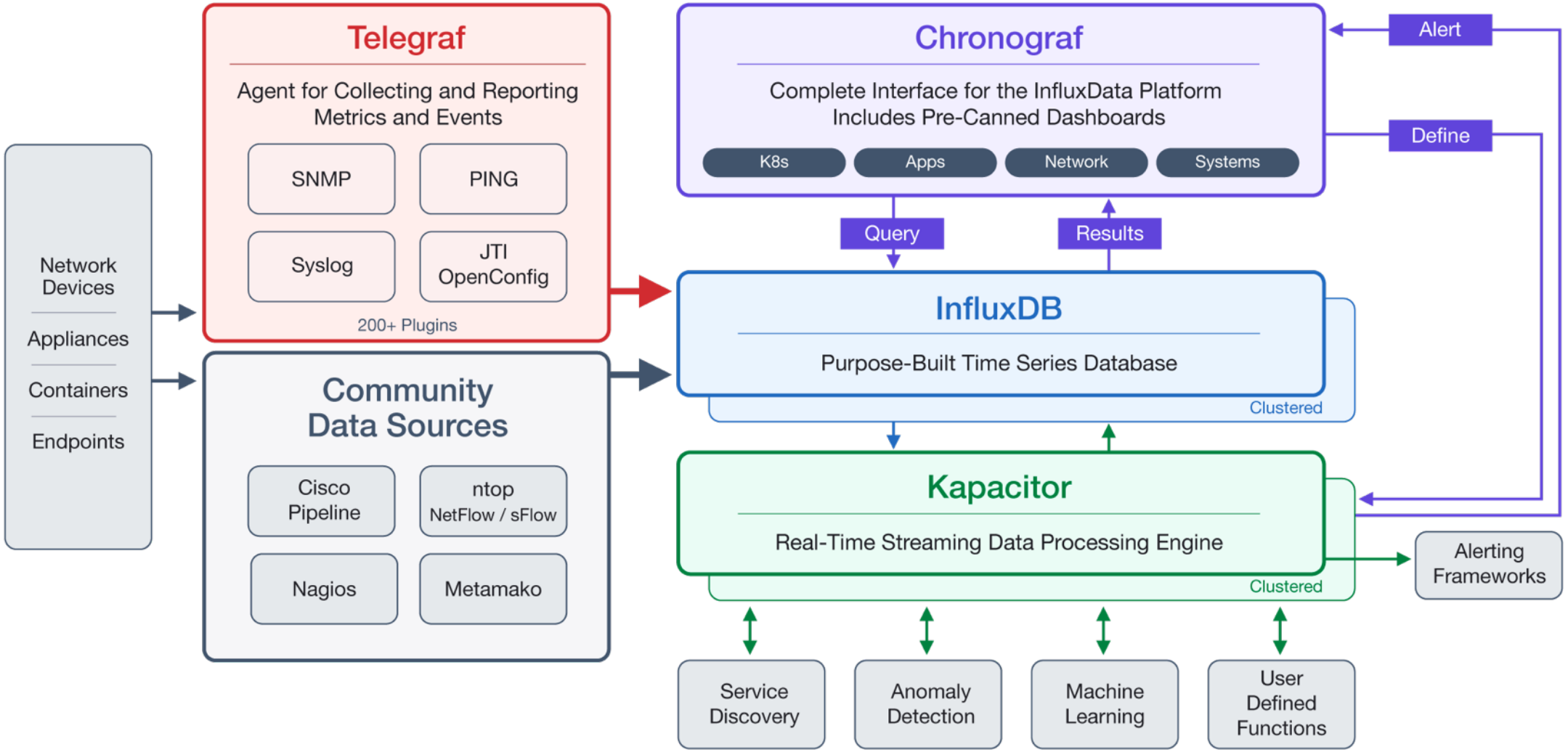
Modern Data Monitoring and Processing Model



Modern Data Monitoring and Processing Model



TICK Architecture



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Products

Telegraf	InfluxDB	Chronograf	Kapacitor
Agents for collecting and reporting metrics and events	Time Series Database	Data visualization	Streaming data processing engine
Logstash Prometheus Fluentd	Graphite Prometheus OpenTSDB Elasticsearch	Grafana Kibana Datadog Splunk	Kafka Grafana Prometheus

Why InfluxDB?

Rank			DBMS	Database Model	Score		
Nov 2019	Oct 2019	Nov 2018			Nov 2019	Oct 2019	Nov 2018
1.	1.	1.	InfluxDB	Time Series	19.93	+0.31	+6.29
2.	2.	2.	Kdb+	Time Series, Multi-model	5.29	-0.15	+0.44
3.	3.	↑ 6.	Prometheus	Time Series	3.64	+0.04	+1.69
4.	4.	↓ 3.	Graphite	Time Series	3.32	-0.02	+0.48
5.	5.	↓ 4.	RRDtool	Time Series	2.90	+0.19	+0.18
6.	6.	↓ 5.	OpenTSDB	Time Series	2.13	+0.21	+0.11
7.	7.	7.	Druid	Multi-model	1.79	-0.05	+0.43
8.	8.	8.	TimescaleDB	Time Series, Multi-model	1.73	+0.22	+1.19
9.	↑ 11.	↑ 13.	FaunaDB	Multi-model	0.61	+0.14	+0.40
10.	10.	↑ 14.	GridDB	Time Series, Multi-model	0.57	+0.03	+0.40

source: https://db-engines.com/en/ranking/time+series+dbms

Why InfluxDB, Telegraf, Grafana

InfluxDB

- High performance, written in Go
- Native HTTP API
- Powerful SQL-like language
- Supports logs
- Down sampling

Telgraf

- High performance, written in Go
- Collect and send almost all kinds of data
- 200+ input, output plugins

Grafana

- Rich data sources support
  - InfluxDB, Prometheus, MySQL
- Templating
- Alerts
- Plugin, App

Let's Do It

- Lab 1 - Install Docker
- Lab 2 – Using Docker Compose
  - Download/Clone lab files
    - Download & decompress: https://github.com/tiunn/tig-labs-2/archive/master.zip
    - Clone:

```
hlchang@THL ~/D/Code>git clone https://github.com/tiunn/tig-labs-2.git
Cloning into 'tig-labs-2'...
remote: Enumerating objects: 24, done.
remote: Counting objects: 100% (24/24), done.
remote: Compressing objects: 100% (21/21), done.
remote: Total 24 (delta 3), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (24/24), done.
hlchang@THL ~/D/Code> cd tig-labs-2
```

Let's Do It

- Edit docker-compose.yaml
- Edit telegraf.conf
- Edit influxdb.conf
- Edit grafana.ini

Let's Do It

- Dock Compose commands:

```
hlchang@THL ~/D/Code> cd tig-labs-2
hlchang@THL ~/D/Code> docker-compose up
hlchang@THL ~/D/Code> docker-compose down
hlchang@THL ~/D/Code> docker-compose restart
hlchang@THL ~/D/Code> docker-compose start
hlchang@THL ~/D/Code> docker-compose stop
```

- Access Grafana

Time Series Data

Measurement	Stock_Price
Tag	Name=Apple Inc. Symbol=AAPL
Fields	Open=133.08 High=136.27 Low=132.75 Close=135.72 Volume=136.67M Change=14.12%
Timestamp	2/13/2017

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InfluxDB Data Format

`Stock_Price,`	`Name="Apple Inc.",Symbol="AAPL"`	`Open=133.08,High=136.27,Low=132.75`	`1486944000000000000`
measurement	Tags	Fields	Timestamp
`CiscoSwitch,`	`ifIndex=1,ifAlias="Gi0/1"`	`ifInOctets=133,ifOutOctes=136,ifStatus=1`	`1487244000000000000`
measurement	Tags	Fields	Timestamp
`HPE_Servers,`	`dc="TW01",sensor="sysCpu"`	`user=13,system=26,idle=55,kernel=5,irq=1`	`1487434000000000000`
measurement	Tags	Fields	Timestamp

Key-Value Pairs

Stock_Price	Name="Apple Inc.",Symbol="AAPL"	Open=133.08,High=136.27,Low=132.75	1486944000000000000
measurement	Tags	Fields	Timestamp

Tag key	Tag value
Name	"Apple Inc."

Field key	Field value
Name	"Apple Inc."

Tag key	Name, Symbol
Tag value	"Apple Inc.", "AAPL"

Field key	Open, High, Low
Field value	133.08, 136.27, 132.75

InfluxDB and Telegraf Configuration

InfluxDB

- Default configuration directory
- /etc/influxdb
- Default binding port: 8086
- Enable authentication (recommended)
- https://github.com/influxdata/influxdb

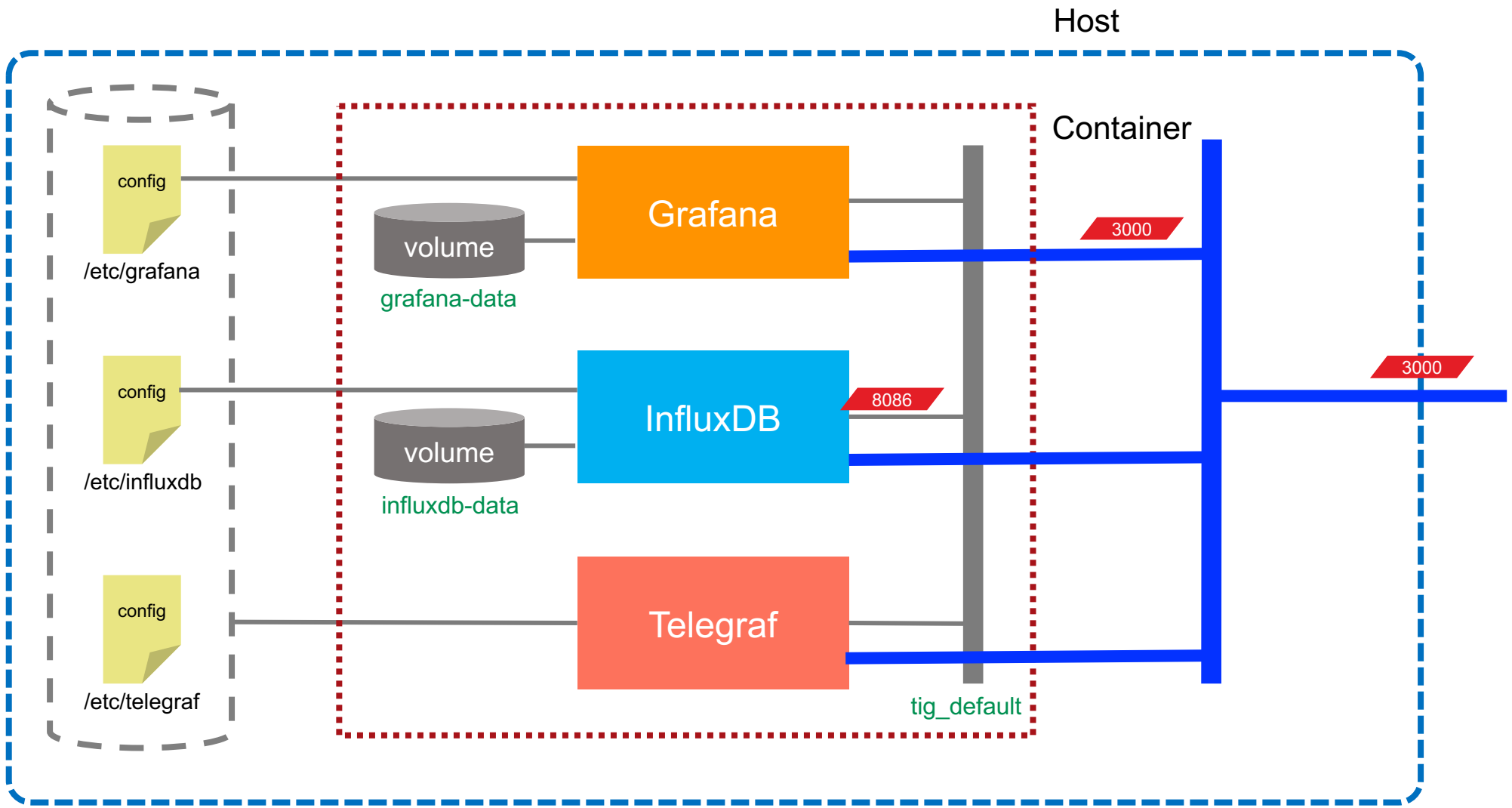
Telegraf

- Default configuration directory
  - /etc/telegraf
  - /etc/telegraf/telegraf.d
- Telegraf will load every file in the direcotry
- First, configure global parameters
  - interval, debug, logfile
- Then configure input and output plugins
- https://github.com/influxdata/telegraf

Grafana Features

- Data source
- Organization
- Team
- User
- Folder
- Dashboard
- Panel
- Metrics
- Query
- Plugin
- Template
- Variable
- User
- Playlist
- Alert

Lab


Host
Container
config
/etc/grafana
volume
grafana-data
Grafana
3000
config
/etc/influxdb
volume
influxdb-data
InfluxDB
8086
3000
config
/etc/telegraf
Telegraf
tig_default

Lab, Lab, Lab

- Lab 3 - Adding data source and creating the first dashboard in Grafana
- Lab 4 - Adding Panels in the dashboard of Grafana
- Lab 5 - Setting up alert channel of Grafana
- Lab 6 - Upgrade Grafana to latest version
- Lab 7 - Configuring variables and template (optional)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Business and technology working as one
We are architects of change
Together we own the possible