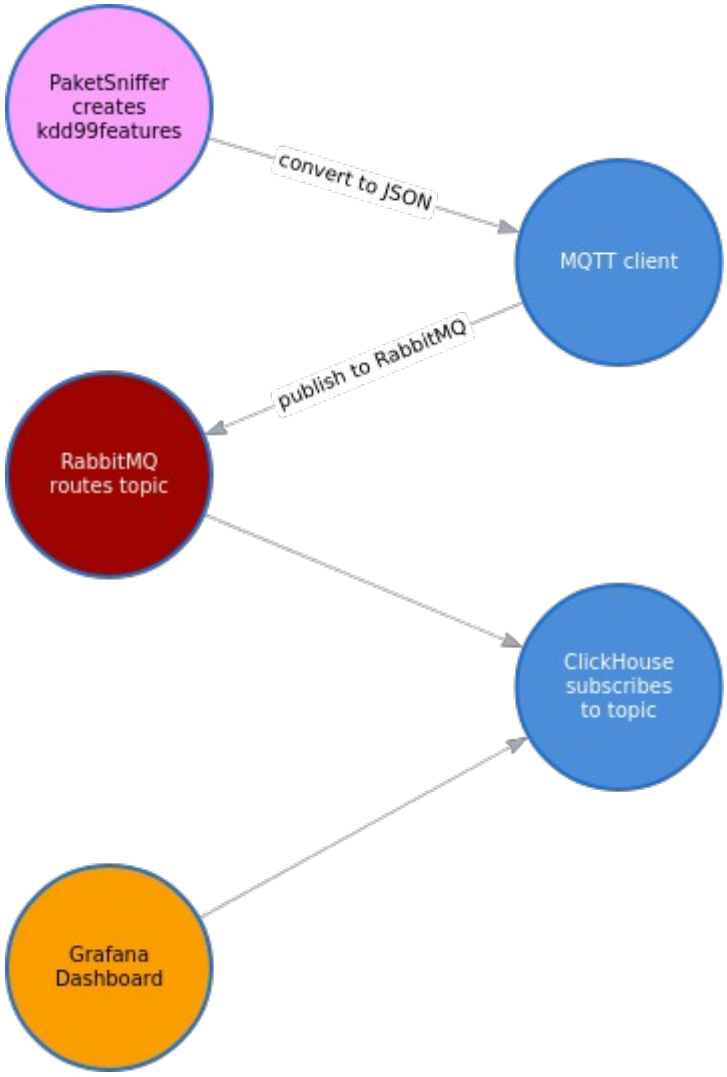
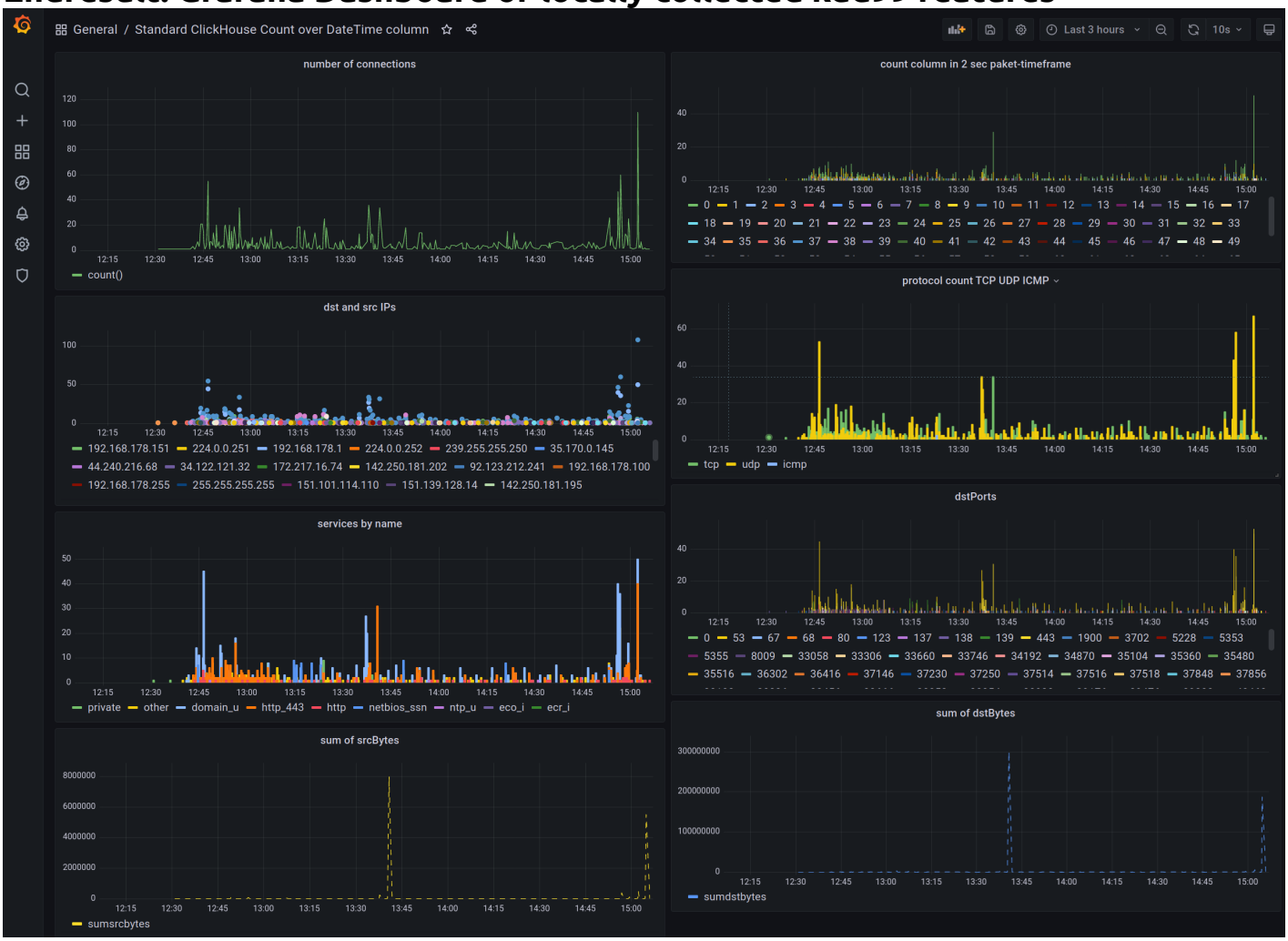
“almost live” KDD99 features to Grafana Dashboard

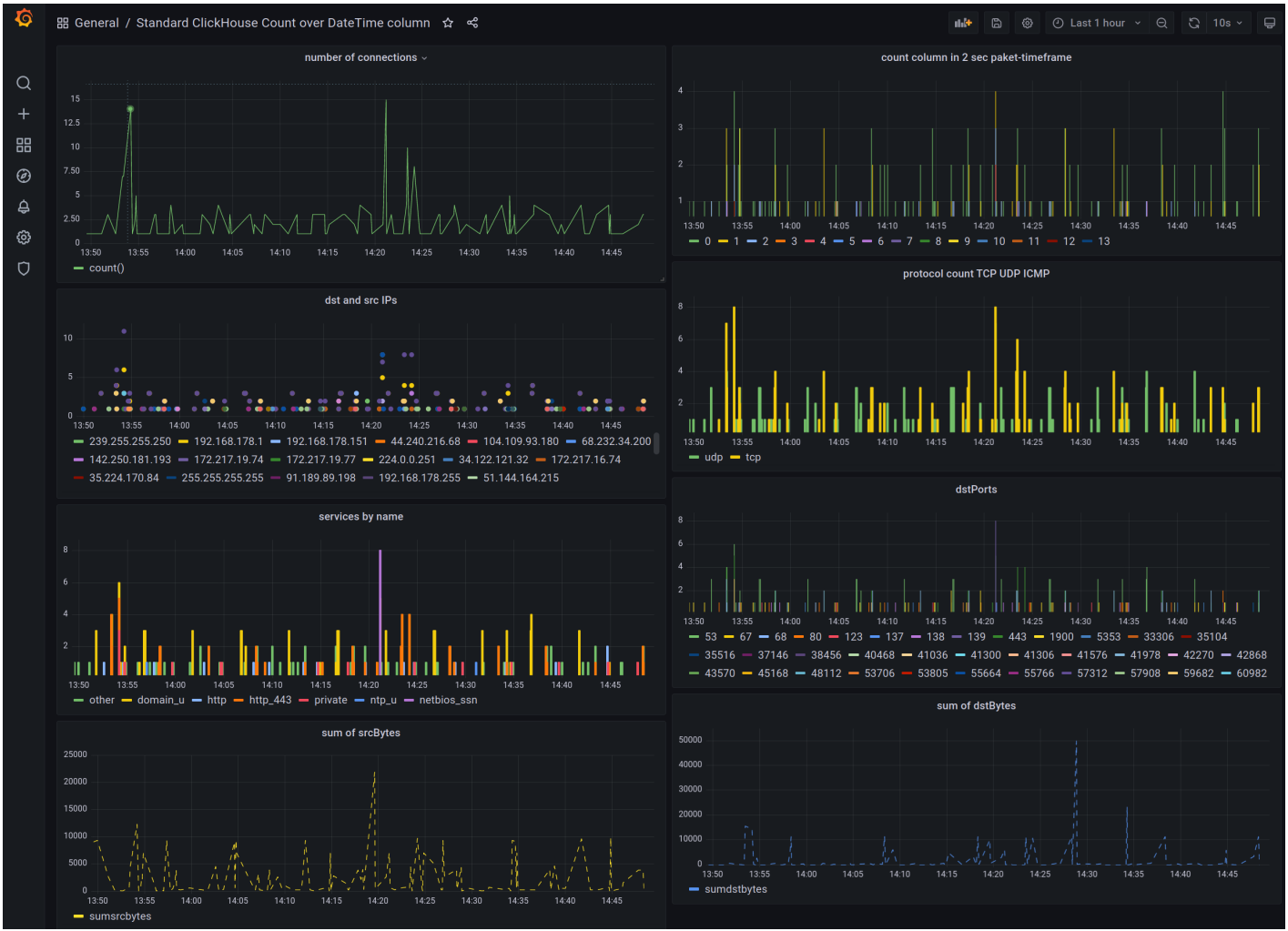
Workflow:

- collect via libpcap
- make kdd99 features
- send via MQTT client to RabbitMQ
- ClickHouse Database connects to RabbitMQ and subscripes to kd99 “topic”
- Grafana visualizes metrics via ClickHouse plugin



Endresult: Grafana Dashboard of locally collected kdd99 features





Packet Sniffer with featues found in the famous kdd99 Dataset:

- add MQTT capabilty to kdd99 feature extractor from https://github.com/AI-IDS/kdd99_feature_extractor

- in a thread send a json string of selected features

- which the Rabbitmq broker with MQTT Plugin will route to ClickHouse column-based Database

- add ClickHouse RabbitMQ Engine with tables with columns according to features

- add Grafana for Dashboarding via ClickHouse plugin (https://grafana.com/grafana/plugins/vertamedia-clickhouse-datasource/)

ClickHouse config:
run commands with "clickhouse-client --password -m" CLI
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```
CREATE TABLE incomingKDD99
(
`time`  DateTime,
`srcIP` String,
`srcPort` UInt16,
`dstIP` String,
`dstPort` UInt16,
`protocol` String,
`srcbytes` UInt64,
`dstbytes` UInt64,
`count` UInt64,
`service` String
)
ENGINE = RabbitMQ SETTINGS rabbitmq_host_port = 'localhost:5672', rabbitmq_exchange_name =
'toClickHouse', rabbitmq_exchange_type = 'direct', rabbitmq_routing_key_list = 'rabbitkdd99',
rabbitmq_format = 'JSONEachRow', rabbitmq_num_consumers = 1, date_time_input_format =
'best_effort';


CREATE TABLE kdd99
(
`time`  DateTime,
`srcIP` String,
`srcPort` UInt16,
`dstIP` String,
`dstPort` UInt16,
`protocol` String,
`srcbytes` UInt64,
`dstbytes` UInt64,
`count` UInt64,
`service` String
)
ENGINE = MergeTree
ORDER BY time;

CREATE MATERIALIZED VIEW kdd99_material TO kdd99
   AS SELECT * FROM incomingKDD99;
```

==========

```
CREATE TABLE incomingKDD99
(
    `time` DateTime,
    `srcIP` String,
    `srcPort` UInt16,
    `dstIP` String,
    `dstPort` UInt16,
    `protocol` String,
    `srcbytes` UInt64,
    `dstbytes` UInt64,
    `count` UInt64,
    `service` String
)
ENGINE = RabbitMQ
SETTINGS rabbitmq_host_port = 'localhost:5672', rabbitmq_exchange_name = 'toClickHouse', rabbitmq_exchange_type = 'direct', rabbi
tmq_routing_key_list = 'rabbitkdd99', rabbitmq_format = 'JSONEachRow', rabbitmq_num_consumers = 1, date_time_input_format = 'best
_effort'

Query id: a512c16e-4b15-4371-b443-2f35d96d4c63

Ok.

0 rows in set. Elapsed: 1.437 sec.

ubu :) CREATE TABLE kdd99
:-] (
:-] `time`  DateTime,
:-] `srcIP` String,
:-] `srcPort` UInt16,
:-] `dstIP` String,
:-] `dstPort` UInt16,
:-] `protocol` String,
:-] `srcbytes` UInt64,
:-] `dstbytes` UInt64,
:-] `count` UInt64,
:-] `service` String
:-] )
:-] ENGINE = MergeTree
:-] ORDER BY time;

CREATE TABLE kdd99
(
    `time` DateTime,
    `srcIP` String,
    `srcPort` UInt16,
    `dstIP` String,
    `dstPort` UInt16,
    `protocol` String,
    `srcbytes` UInt64,
    `dstbytes` UInt64,
    `count` UInt64,
    `service` String
)
ENGINE = MergeTree
ORDER BY time

Query id: d91e9082-9b15-4754-9167-b29698c7602d

Ok.

0 rows in set. Elapsed: 0.014 sec.

ubu :)
ubu :) CREATE MATERIALIZED VIEW kdd99_material TO kdd99
:-]     AS SELECT * FROM incomingKDD99;
:-]     ;

CREATE MATERIALIZED VIEW kdd99_material TO kdd99 AS
SELECT *
FROM incomingKDD99

Query id: 75275476-7275-470b-a40f-eb24a3da21f8

Ok.

0 rows in set. Elapsed: 0.022 sec.

ubu :)
```

- will add RabbitMQ Engine and materialized view to access persistent table

RABBITMQ config:
enable MQTT plugin & enable anonymous publishing

- add “mqtt.allow_anonymous = true” to “/etc/rabbitmq/rabbitmq.conf”
- “[rabbitmq_management,rabbitmq_mqtt].” to “/etc/rabbitmq/enabled_plugins”

- binding from amq.topic Exchange, which stores all MQTT messages, to ClickHouse queue