FTS

File Transfer Service

# FTS Monitoring:

## *Following the IPv6 Trail*

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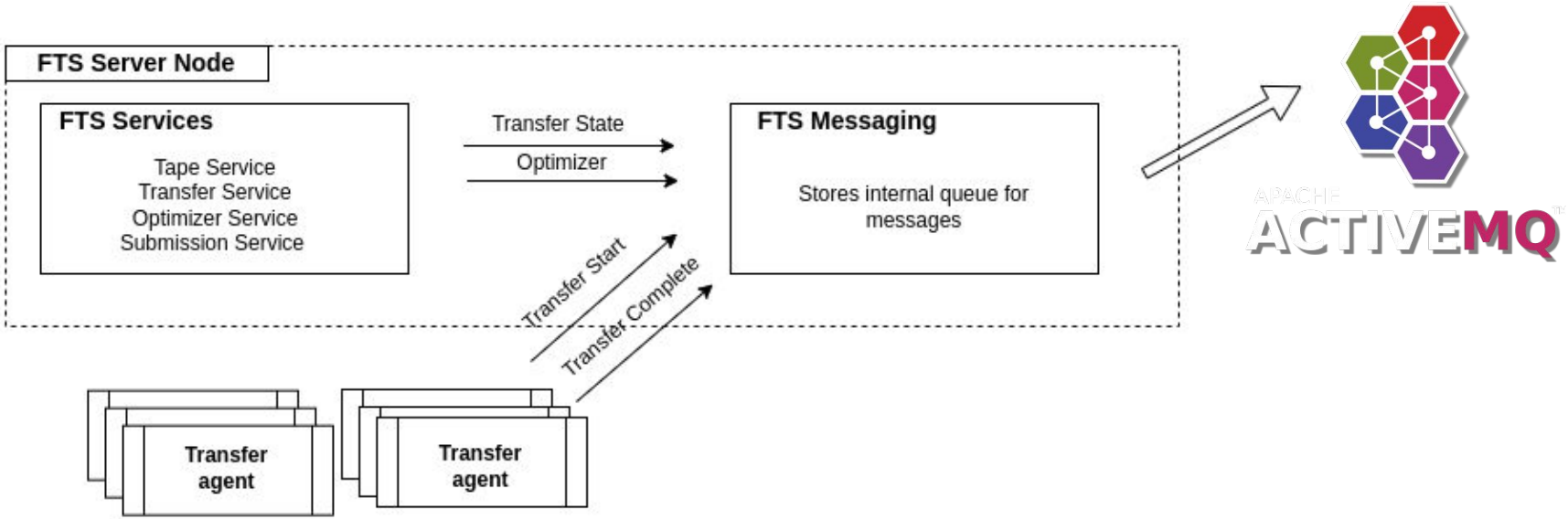
*HEPiX IPv6 Working Group (26th October 2022)*

I. FTS Monitoring Overview

II. FTS & IPv6 Monitoring

III. HTTP-TPC: current status and limitations

# I. FTS Monitoring Overview (in 1 picture)

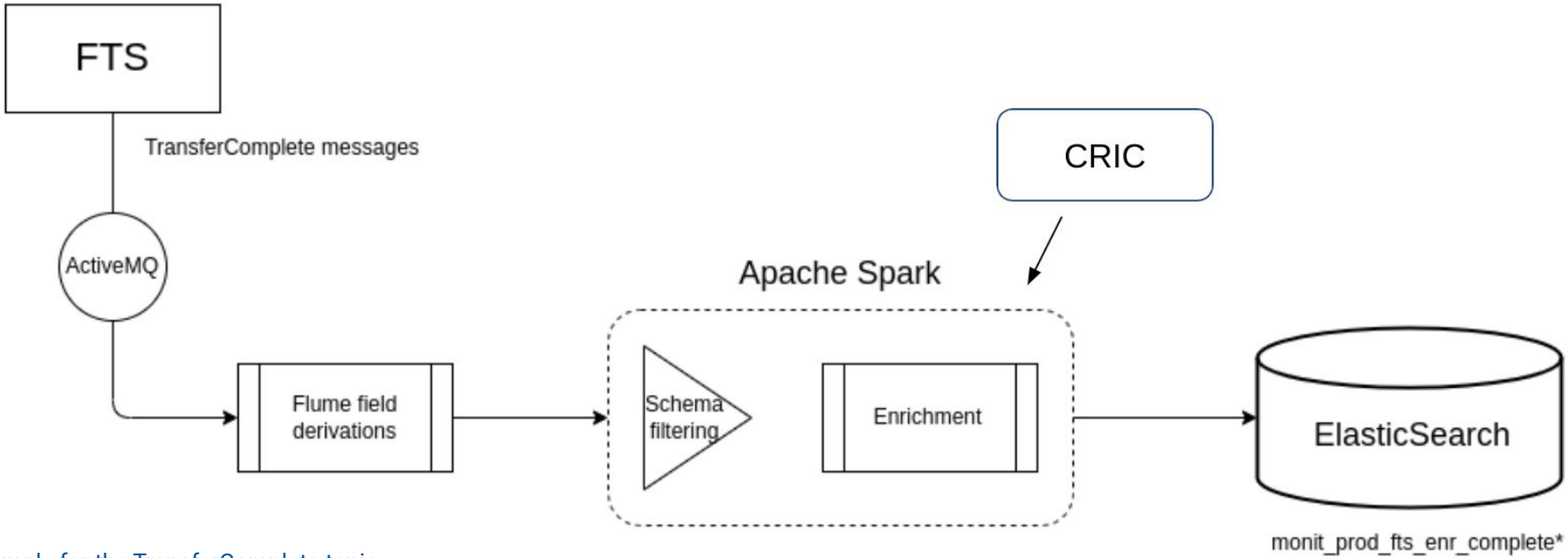


# FTS Monitoring Overview – key points

- FTS sends monitoring messages at key moments in transfer lifecycle
- A dedicated FTS component sends messages to ActiveMQ
- There are 4 types of messages sent:
  - Transfer Start (`transfer.fts_monitornig_start`)
  - Transfer Complete (`transfer.fts_monitornig_complete`)
  - Transfer State (`transfer.fts_monitornig_state`)
  - Optimizer State (`transfer.fts_monitornig_queue_state`)

*Complete format in FTS Messaging documentation*

# FTS Monitoring Messages & CERN Monit




Example for the TransferComplete topic.
Other message topics follow a simpler model.

# CERN Monit + FTS – key points

- FTS messages are processed by the CERN Monit system
- Field derivation step: existing FTS fields are used to compute new fields

  (e.g.: `transfer_duration = finish_timestamp - start_timestamp`)

- Field enrichment step: information from outside is added to the message

  (e.g.: `site topology via CRIC`)

- Final information is stored in ElasticSearch

Note: Ongoing effort by the FTS team to reduce the derivation step and provide as many fields directly at the source

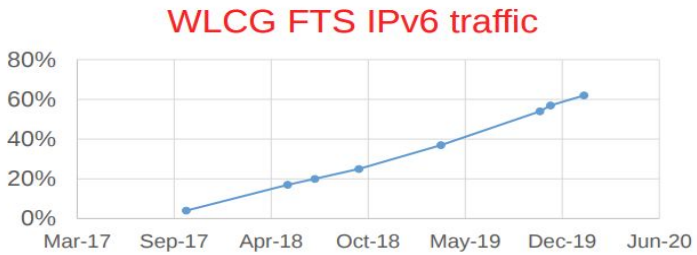
# CERN Monit + FTS – key points

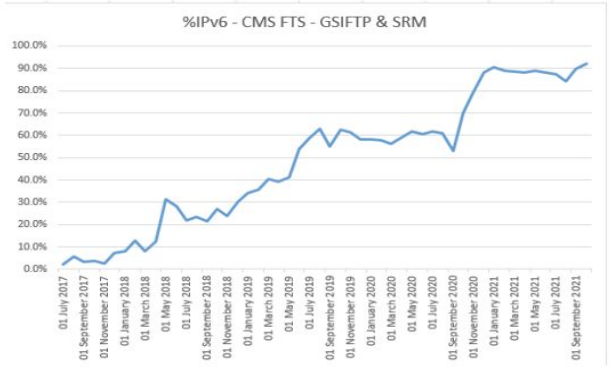
- Mapping between FTS ActiveMQ ↔Monit ElasticSearch:
  - `transfer_complete` → `monit_prod_fts_enr_complete*`
  - `transfer_start` → `monit_prod_fts_raw_start*`
  - `transfer_state` → `monit_prod_fts_raw_state*`
  - `optimizer_state` → `monit_prod_fts_raw_queue*`
- Above ES indexes are kept for **only 30 days** (monit-kibana.cern.ch)
- The TransferComplete data stream is aggregated into **1h buckets**

  → `monit_prod_fts_agg_complete*` (monit-kibana-acc.cern.ch)
- This data is kept **ad-infinitum**

# II. FTS & IPv6 Monitoring – the good

FTS data transfers – Jan 2020 (>60%)

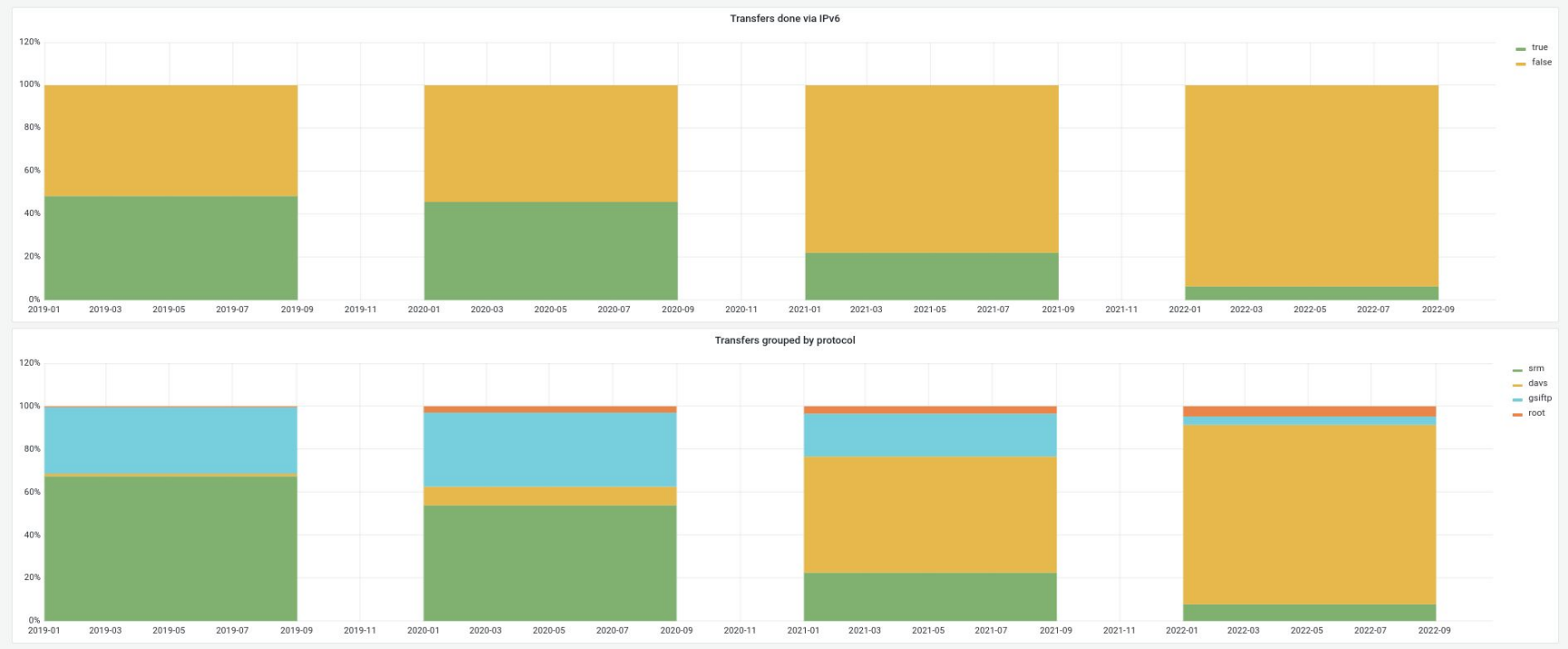



26 Oct 2022 D Kelsey, IPv6 working group 11

*Slide borrowed from David Kelsey's [presentation]*

# II. FTS & IPv6 Monitoring – the bad




*Charts plotted using the FTS Aggregated data*

# II. FTS & IPv6 Monitoring – the ugly

- FTS IPv6 transfer data relies on the `data.ipv6` field (sent by FTS to MONIT)
- FTS collects this info from Gfal2
  - Gfal2 gets this info from underlying client library
- The `data.ipv6` field is a boolean (default false)

1. We depend on the underlying client library to make this info available
2. No way to distinguish `ipv6 = false` between IPv4 or unknown

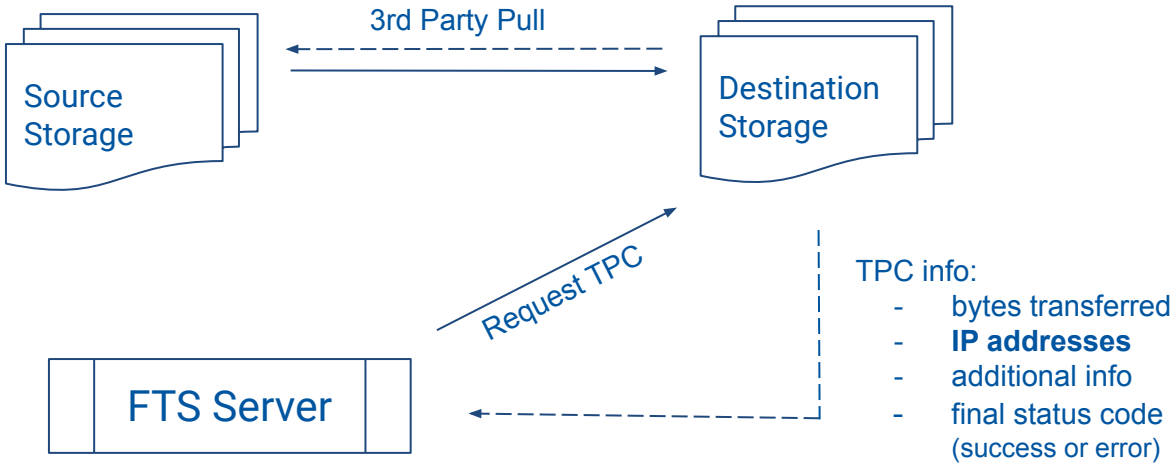
# Evolving FTS IPv6 Monitoring

- Introduce a new field `ipver`
- Two FTS IP fields will co-exist:

```
ipv6  = true | false (boolean type)
ipver = ipv4 | ipv6 | ipv4+6 | unknown
        (string type)
```

- Existing dashboards / scripts won't be impacted by the addition of a new field
- Concerned dashboards / scripts **will have to adopt** the new field
- The `ipv6` is no longer guaranteed long-term longevity
  (e.g.: may disappear in 1y+)

# III. HTTP-TPC: current status




During HTTP-TPC, FTS can identify IP type only if sent by Active Storage via TPC info.

*Note: Parsing of IP addresses in HTTP-TPC info available since FTS v3.12.0 (July 2022)*

# III. HTTP-TPC: limitations

- IPv4/6 status is identified via Performance Markers (documentation)
- Performance Markers are **not guaranteed**
  - Missing Performance Markers for small files !
- The `RemoteConnections` field is **optional**

**Proposal:** have a guaranteed Performance Marker on file close

- Raised at the DOMA-BDT meeting (Indico, 21st September 2022)
- HTTP-TPC specification extension to follow

# Conclusion

- The transition from GridFTP to HTTP-TPC led to losses in FTS IPv6 reporting
- HTTP-TPC is a protocol specification, to be implemented by each Storage Provider
  - Updating the IPv6 picture is a shared effort of FTS + Storage Providers
  - Improvements to the HTTP-TPC protocol are underway
- FTS will move to a better way to report the IP version
  - Current FTS `data.ipv6` field is too easy to misinterpret
  - `data.ipver` field brings the needed change (FTS-1832 / scheduled for release v3.12.3)
  - Concerned dashboards will need to eventually change to the new field

# FTS

File Transfer Service

- cern.ch/fts
- fts-devel@cern.ch
- https://gitlab.cern.ch/fts/fts3
- https://gitlab.cern.ch/dmc/gfal2