



# JANA

## JRU Data Analysis Platform

6/14/2021

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## JANA Platform allows to

- **Increase safety**
- **Increase regularity/punctuality**
- **Perform automatic detailed investigation of root causes of anomalies and incidents!**

### Examples of anomalies and incidents:

- ✓ exceeding the authorized speed in STM and ETCS
- ✓ violations of control rules
- ✓ emergency braking (vigilance, automatic standby, emergency braking following the CVR, signal overruns, eurobalise failures, engine failure, etc.)
- ✓ service braking in ETCS (during speed limits and late confirmations of ETCS mode changes)
- ✓ non-compliance with green driving
- ✓ indirectly an abnormal wear brake rate in order to maximize the brake life and prevent failures
- ✓ Etc

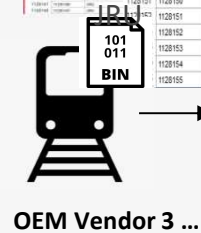
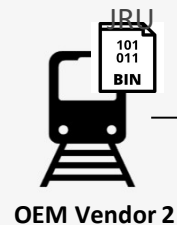
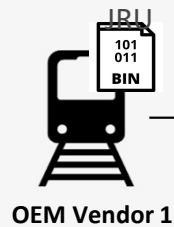
# Standard Analysis of TRU/JRU data



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Time	Location	Speed	Other Parameters
1128150	1128149	DRU ETCS	(01) EVC
1128151	1128150	JRU	(01) GENERAL MESSAGE
1128152	1128151	DRU ETCS	(01) EVC
1128153	1128152	DRU ETCS	(01) EVC
1128154	1128153	JRU	(15) DATA FROM EXTERIA
1128155	1128154	DRU ETCS	(01) EVC
1128156	1128155	JRU	(00) TELEGRAM FROM BAL

ND\_PACKET: 44 --> Data used by applications outside the ERTMS/ETCS system  
 PKT\_TN2T\_44  
 Q\_DIR: 1 --> Nominal  
 L\_PACKET: 48  
 ND\_USER: 13 --> SNCEB / NMBS  
 DATA: '96 96' --> Message sans objet / Boordchap zonder betekenis

ND\_PACKET: 136 --> Infill location reference  
 PKT\_TN2T\_136  
 Q\_DIR: 1 --> Nominal  
 L\_PACKET: 38

id by applications outside the ERTMS/ETCS system

NMBS  
 sans objet / Boordchap zonder betekenis  
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 Q\_DIR: 1 --> Nominal  
 L\_PACKET: 38

.usb,.hea,.dia,.dat  
 .log,.hea,.itm,.opm  
 .usar  
 .chk,.crc,.dkb,.ekb,.fic,.fpb,.id,.lpb  
 ...

Today:

- Several proprietary tools.
- Several manual steps.
- No mixing of information.
- Partial analysis in case of incidents.
- Usually Excel semi-manual analysis => painful and ineffective.



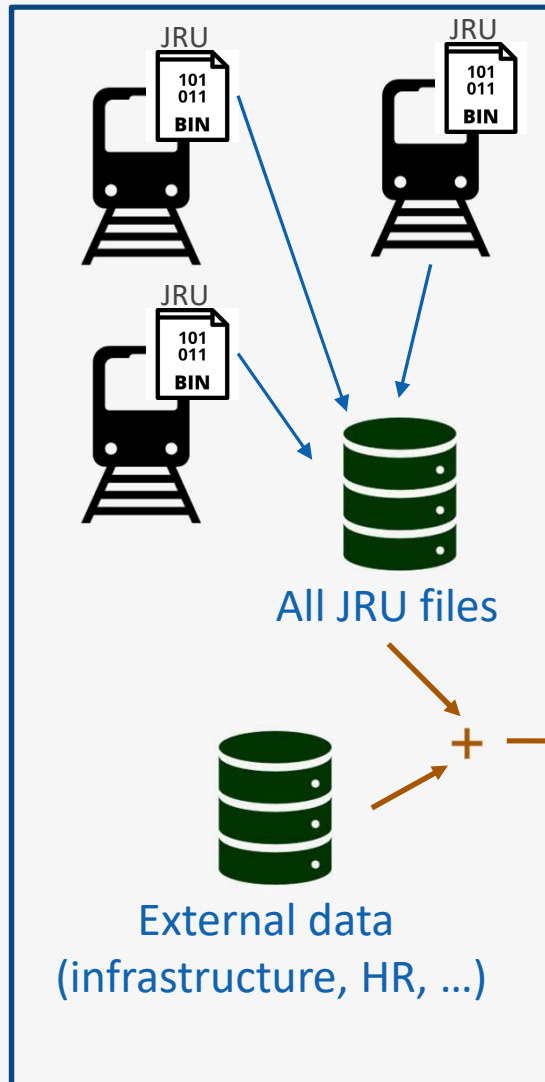
# JANA Overview



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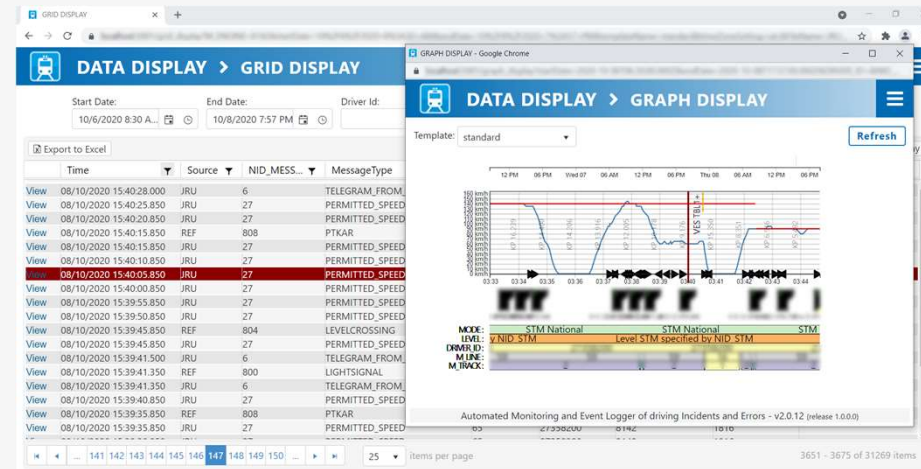
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Customer

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## Multi user web interface



Automated background decoding

Automated background analysis



- Decoded JRU messages
- Enriched data
- Anomalies

JRU Analyzer web application

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# Automated Decoding



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Human readable description for each value of each JRU message

GRID DISPLAY

DATA DISPLAY > GRID DISPLAY

Start Date: 10/6/2020 8:30 A...

Export to Excel

	Time
View	08/10/2020 15:40:28.000
View	08/10/2020 15:40:25.850
View	08/10/2020 15:40:20.850
View	08/10/2020 15:40:15.850
View	08/10/2020 15:40:15.850
View	08/10/2020 15:40:10.850
View	08/10/2020 15:40:05.850
View	08/10/2020 15:40:00.850
View	08/10/2020 15:39:55.850
View	08/10/2020 15:39:50.850
View	08/10/2020 15:39:45.850
View	08/10/2020 15:39:45.850
View	08/10/2020 15:39:41.500
View	08/10/2020 15:39:41.350
View	08/10/2020 15:39:41.350
View	08/10/2020 15:39:40.850
View	08/10/2020 15:39:35.850
View	08/10/2020 15:39:35.850

View Message

Download JRU file

```
"NID_OPERATIONAL": "STM",  
"LEVEL": "Level STM specified by NID_STM",  
"MODE": "STM National",  
"EUROBALISE": {  
  "Q_UPDOWN": "Up link telegram",  
  "M_VERSION": "Version 1.0, introduced in STM 1.2.0 and re-used in STM 1.0.0, 2.0.0, 3.0.0",  
  "Q_MEDIA": "Balise",  
  "N_PIG": "1",  
  "N_TOTAL": "2 balises in group",  
  "M_DUP": "No duplicates",  
  "M_MCOUNT": "253",  
  "NID_C": "STM",  
  "NID_BG": "STM",  
  "Q_LINK": "Unlinked",  
  "PACKETS": [  
    {  
      "DESCRIPTION": "PACKET/DATA_USED_BY_APPLICATIONS_OUTSIDE_THE_ERTMS_ETCS_SYSTEM",  
      "NID_PACKET": "44",  
      "Q_DIR": "Nominal",  
      "L_PACKET": "48",  
      "NID_XUSER": "13",  
      "M_STM13": {  
        "DECADES": "(04) GS - Gr/V"  
      }  
    }  
  ]  
}
```

TimeZone: utc

Graph display

NID\_ENGINE

3651 - 3675 of 31269 items

# Automated Analysis (Ontologies)

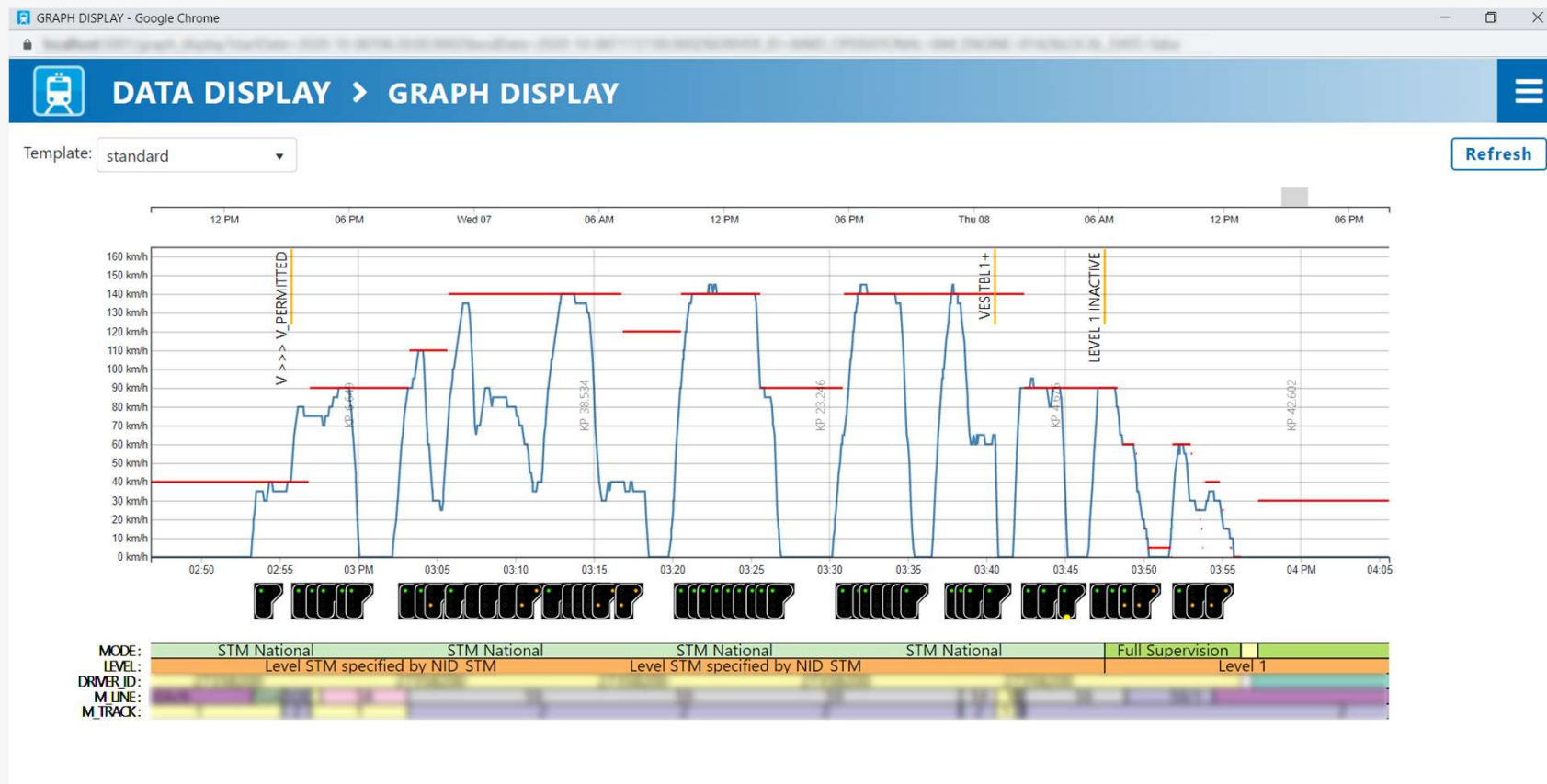


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- Integration of JRU messages with external data (infrastructure, HR, ...):
  - Position of the train (line, track, KP, light signals, balise groups, stations, ...)
  - Computation of the maximum speed limit
  - ...
- Automatic detection of potential anomalies (defined with customer)



# Detailed Analysis of Anomalies

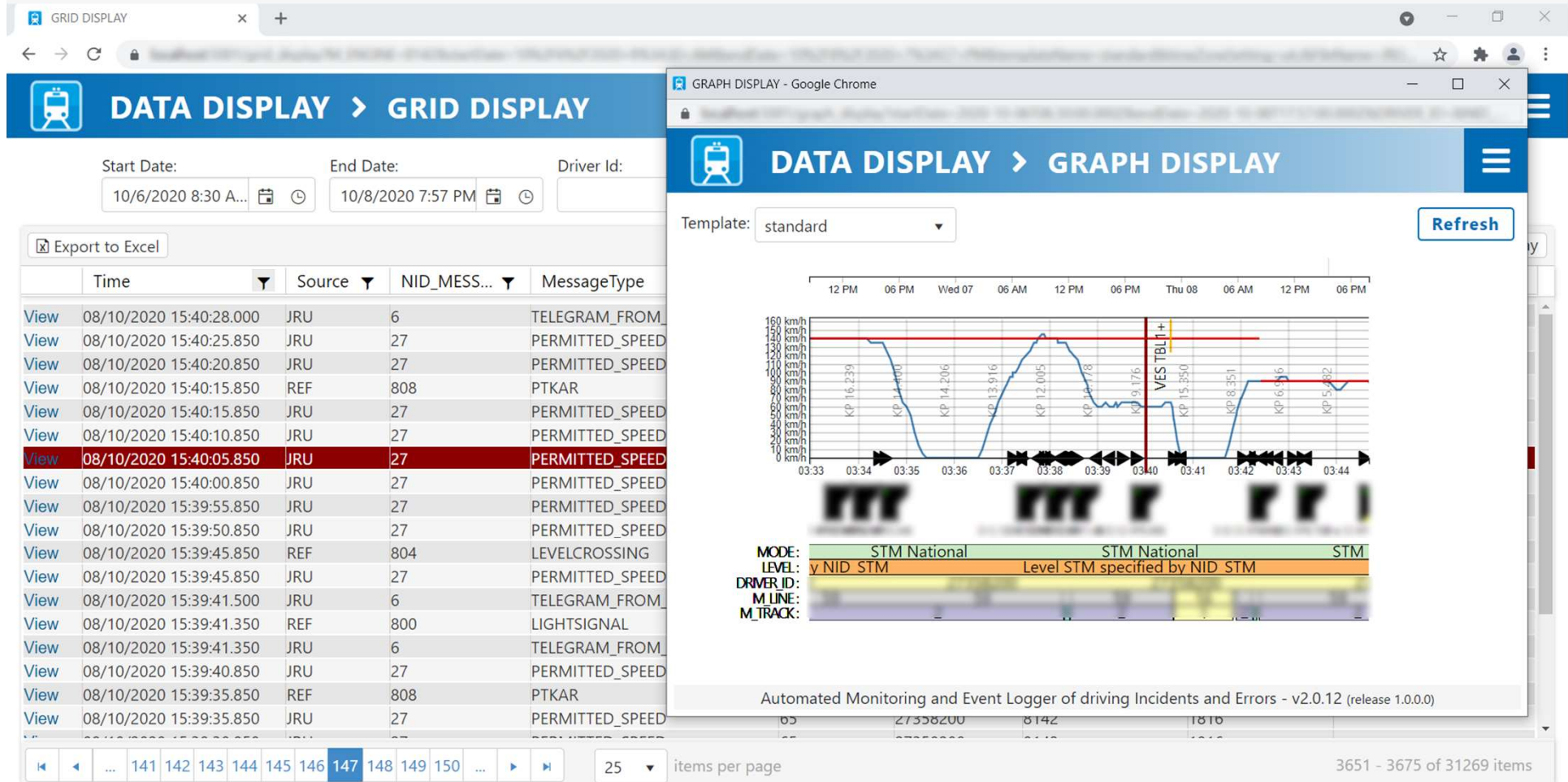


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Synchronisation of the tabular and graphical views for a deep analysis of anomalies



## Benefits



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- **Automated** decoding, enrichment and detection of anomalies.
- **A unified tool** for all JRU files from different manufacturers.
- **Different sources** of data are mixed all together.
- **Customised** rules are specific to each customer.
- **Flexibility** to add extra modules (signalling layout plan, reports, ...).
- **100%** of all JRU files are processed.
- **Multi-user web** application.





**Thank you for your attention!**

[www.ertmssolutions.com](http://www.ertmssolutions.com)

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