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# Automated Fault Analysis System MiAFAS

Power Research and Development Consultants Pvt. Ltd



# Topics of Discussion

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- Automated Fault Analysis System (AFAS)
- MiAFAS
- Case Study
- Summary
- Discussions

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# AUTOMATED FAULT ANALYSIS SYSTEM (AFAS)



# Why AFAS

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- Complexities of power systems are increasing
- Faults are inherent to the Power Systems
- Fault Analysis/ Diagnosis is very important to power system operations
- Manual Processes are time consuming and may be inaccurate
- Need expertise

**Fast and Accurate Fault Assessment is the need**

# What is required

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System that facilitates:

- Automatic retrieval of disturbance files at a common location
- Automatic fault diagnosis, report generation and intimation to concerned personnel
- Substation and system level analysis for a fault
- Better fault location computation and hence facilitates faster fault clearing

**AFAS streamlines the process of fault diagnosis**

# What is AFAS

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- Digital System to correlate and analyze complex data about power system faults and disturbances for,
  - Root Cause Analysis
  - Fault Type and location
  - Cross checking Protection Coordination
- Information extracted from AFAS will aide
  - Operating personnel
  - Protection engineers
  - Maintenance crew

# What's in for Whom

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## Operation & Maintenance Group

- Quick response due to more accurate fault location
- Proactive maintenance
- Fault statistics for optimizing maintenance schedule
- Reduced repair and maintenance efforts
- Improved reliability

## Protection Group

- Determine adequacy of relay operation
- Reduction in time taken for fault analysis
- Meeting regulatory requirements
- Panoramic view of the faults

# Other Benefits

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Efficient Data Utilization

Understanding Cause of Failure

Monitoring Device Performance

Relay Setting Verification

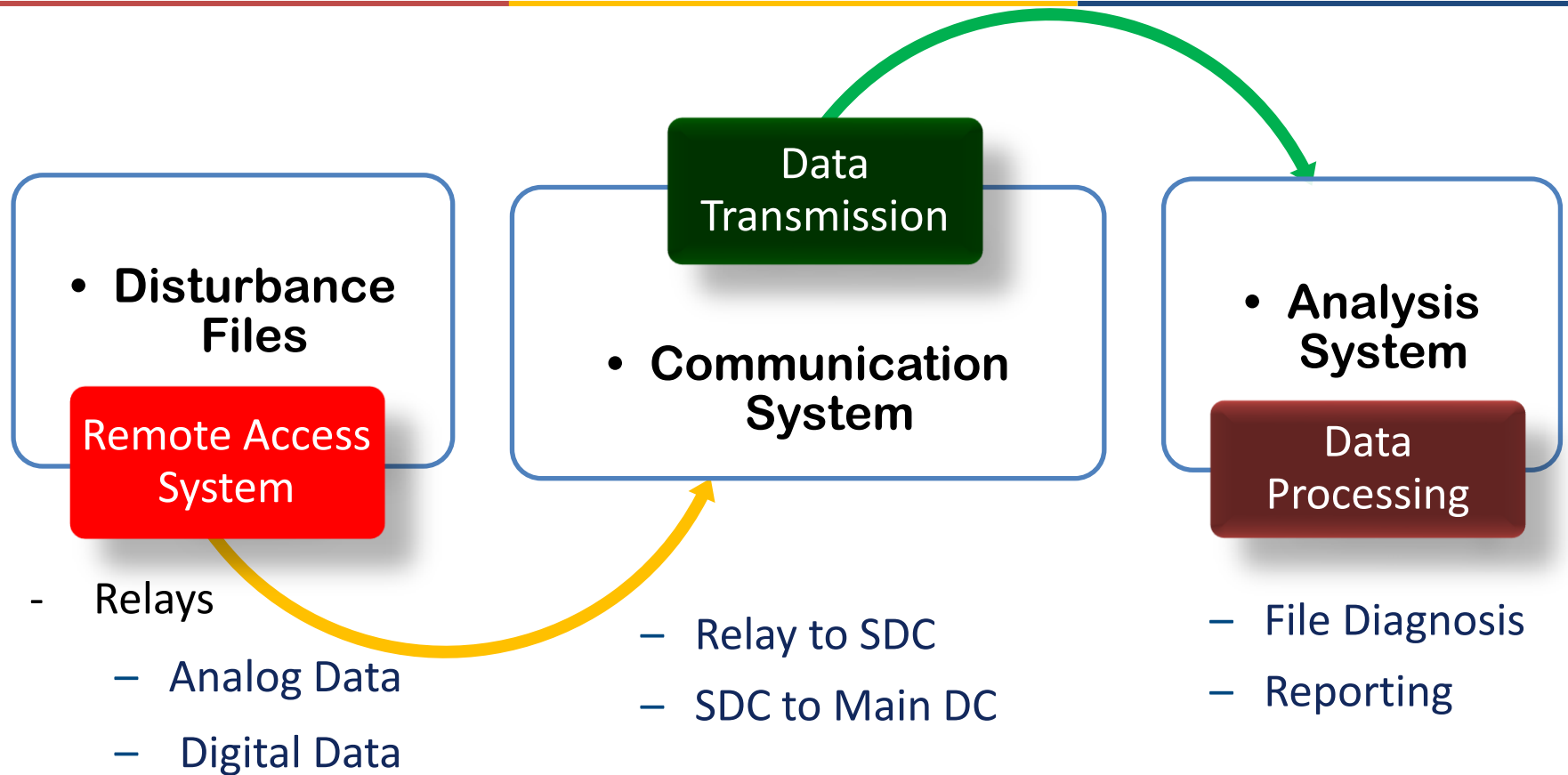
Process Automation

Effective Use of Resources

Improving Reliability



# AFAS – Components

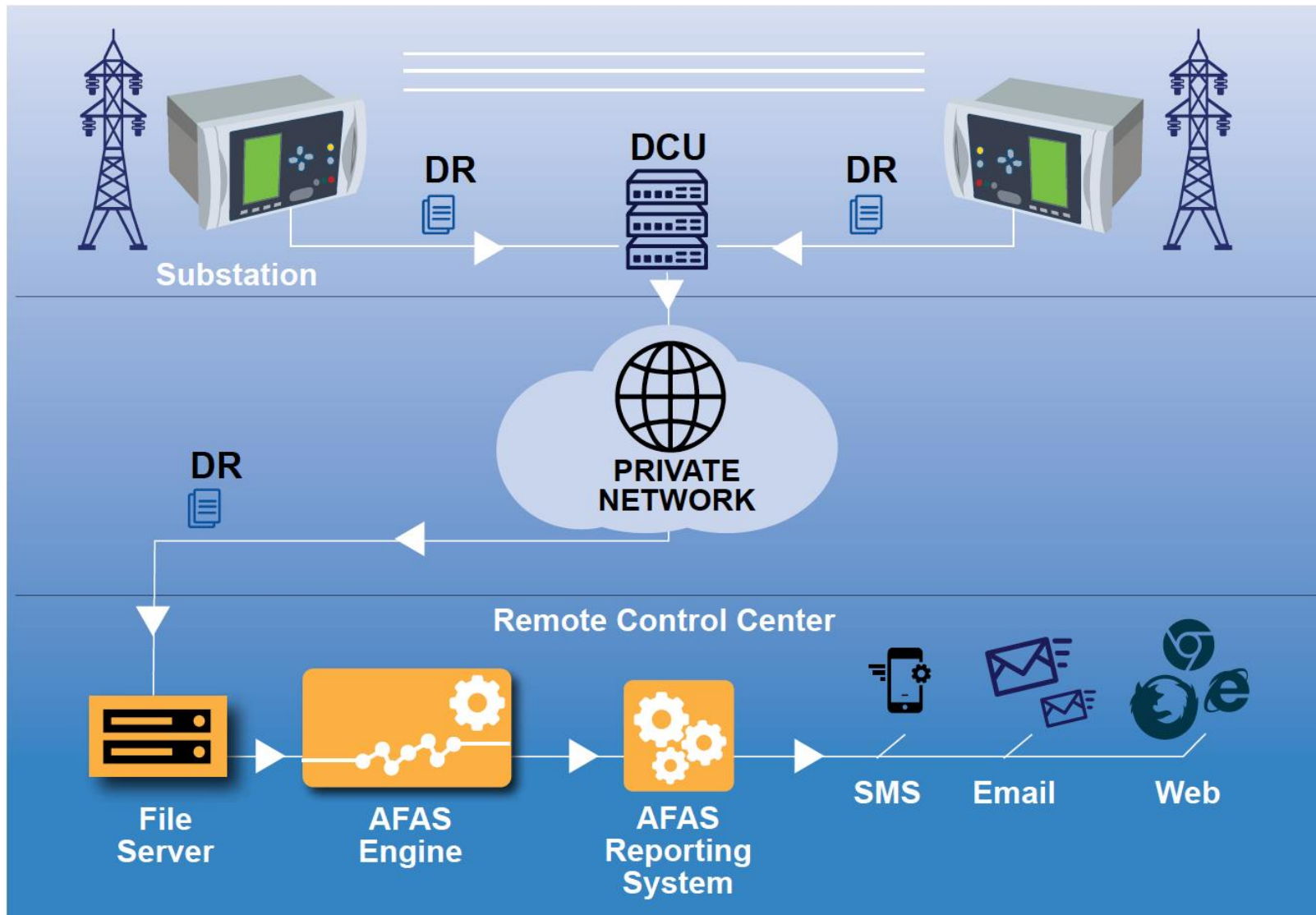


**Measurement, Communication and Analysis**

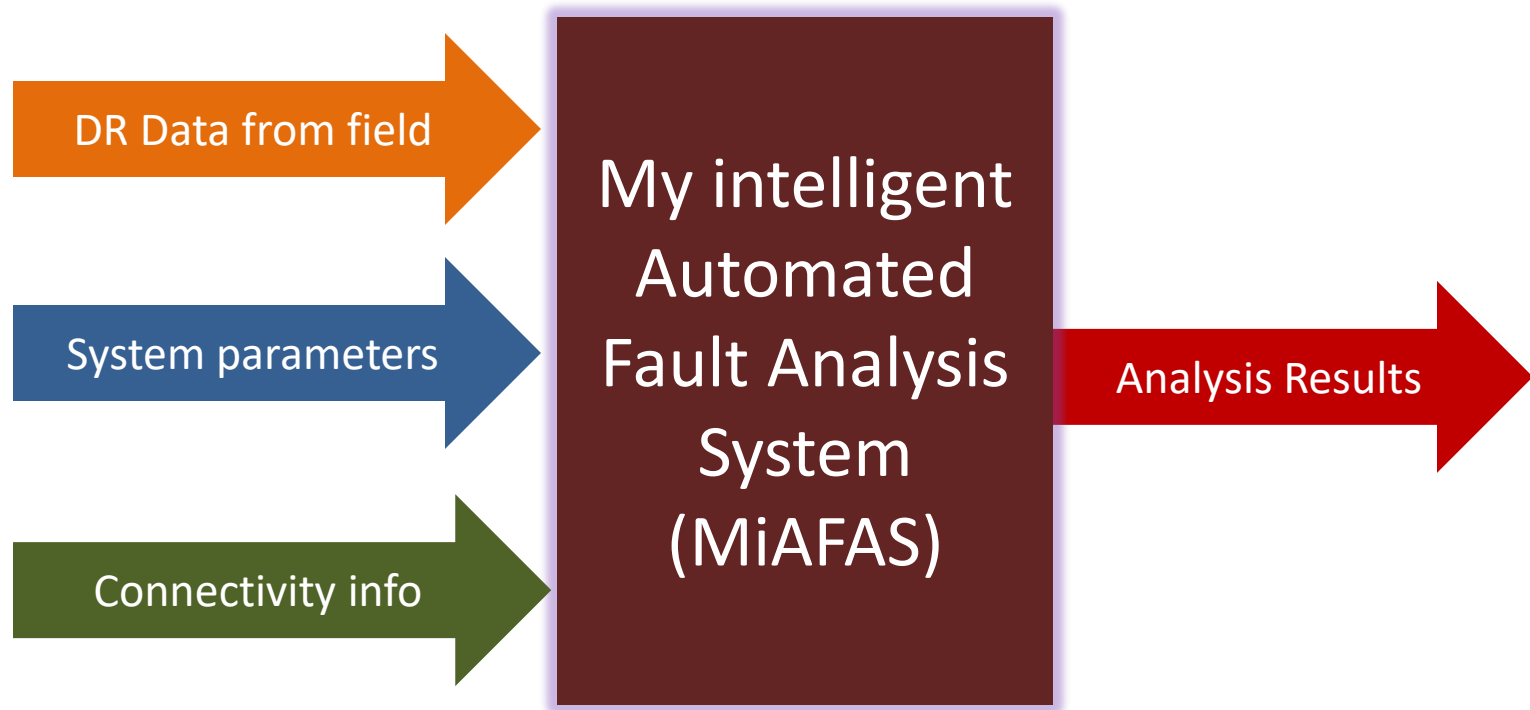
# MiAFAS



# MiAFAS



# MiAFAS Engine



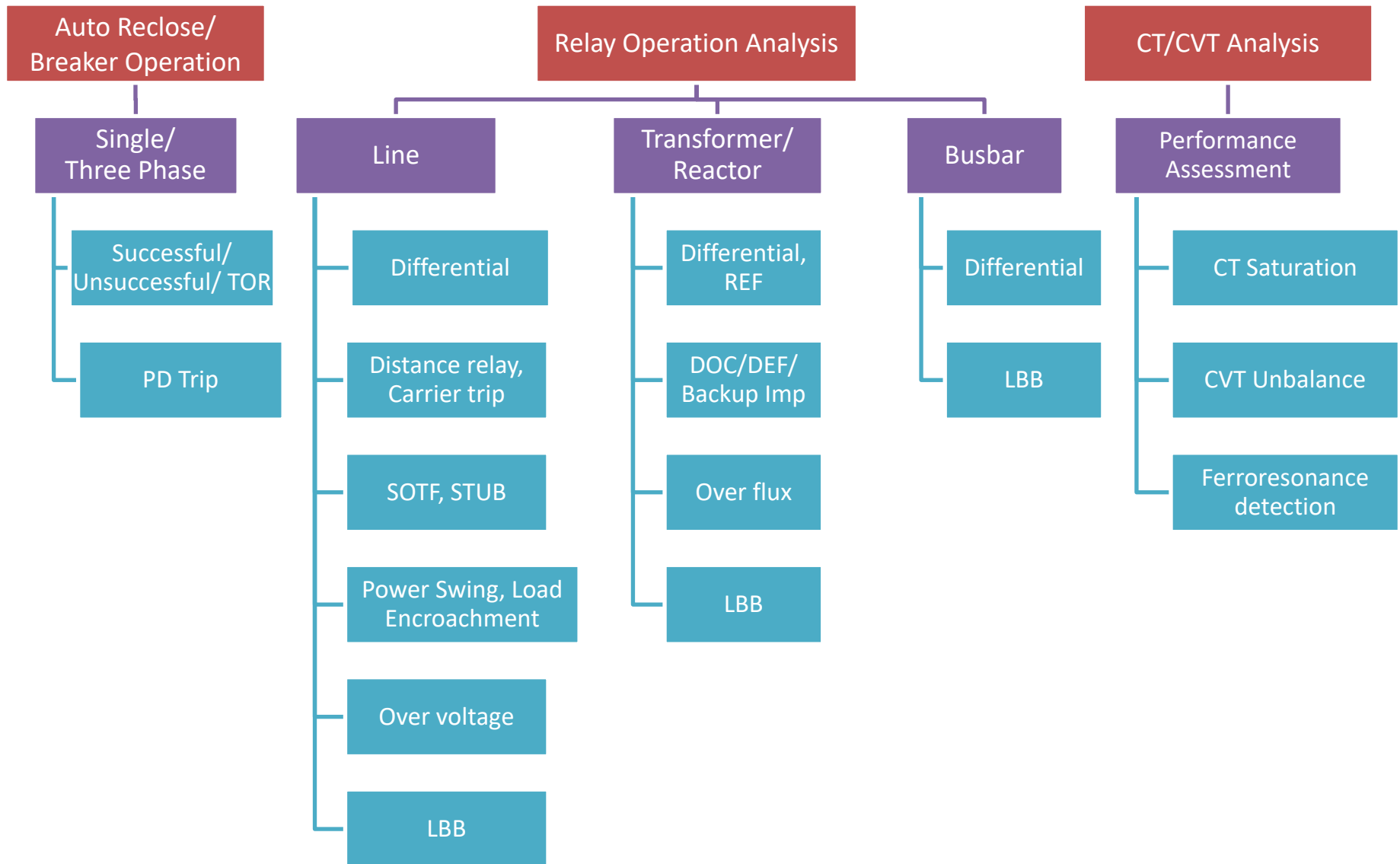
System information “add” Intelligence

# Major Types of analysis

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- Fault Detection and Classification
  - Evolving faults
- Analysis Summary
- Fault location
  - Single and double end
- Digital analysis
  - Sequence of events
- Relay performance validation

# Major Types of Analysis



# Supports



Line protection

- Distance
- Differential
- Over current
- Voltage
- SOTF
- STUB
- Auto closure
- Fuse failure
- Carrier aided protection
- Direct trip



Transformer protection

- Differential
- Over current
- REF



Reactor protection

- Differential
- Backup impedance
- Over current
- REF

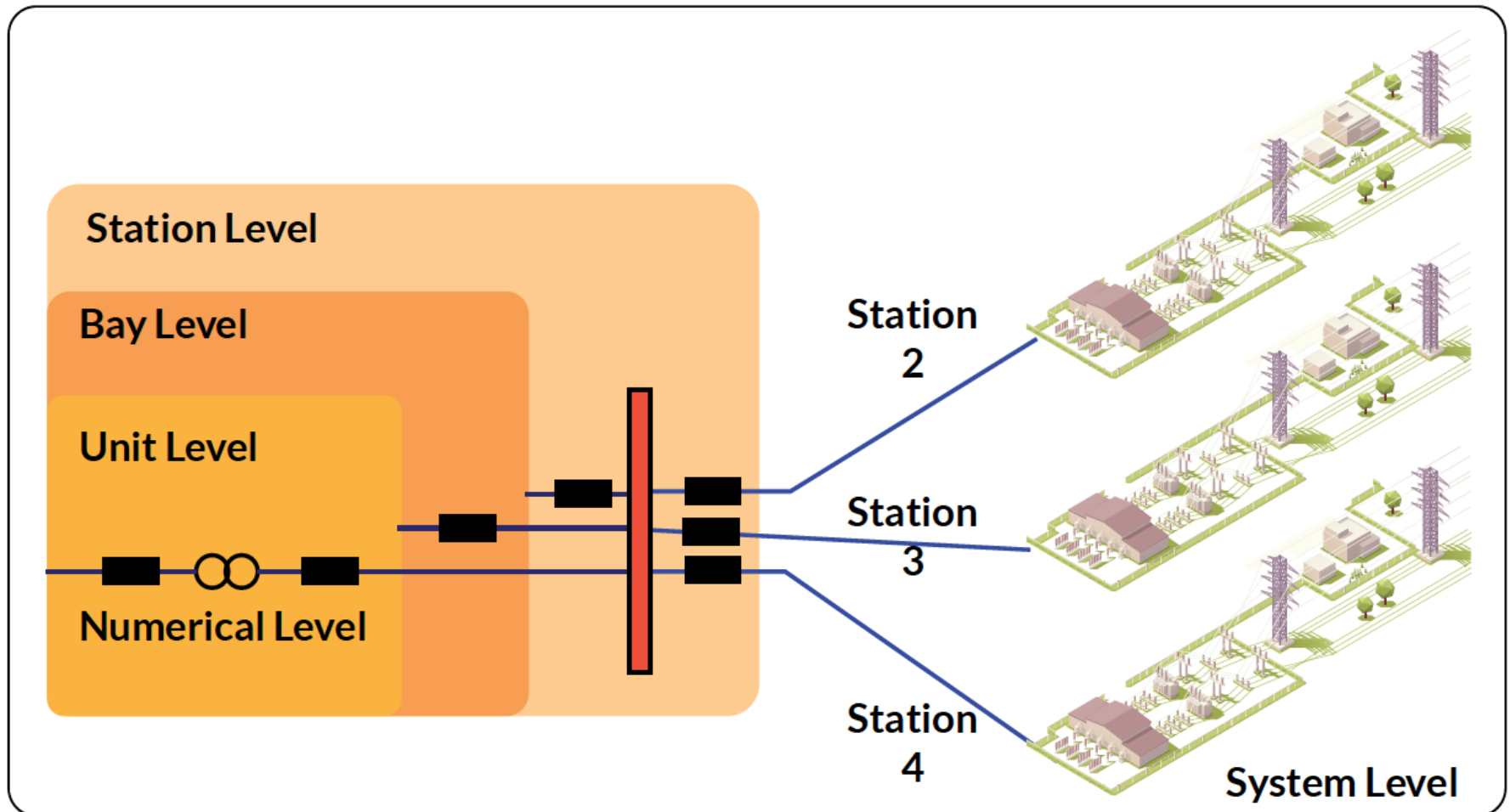


Breaker protection

- Pole discrepancy
- Breaker operation analysis

# MiAFAS – Levels of Analysis

Level wise reporting



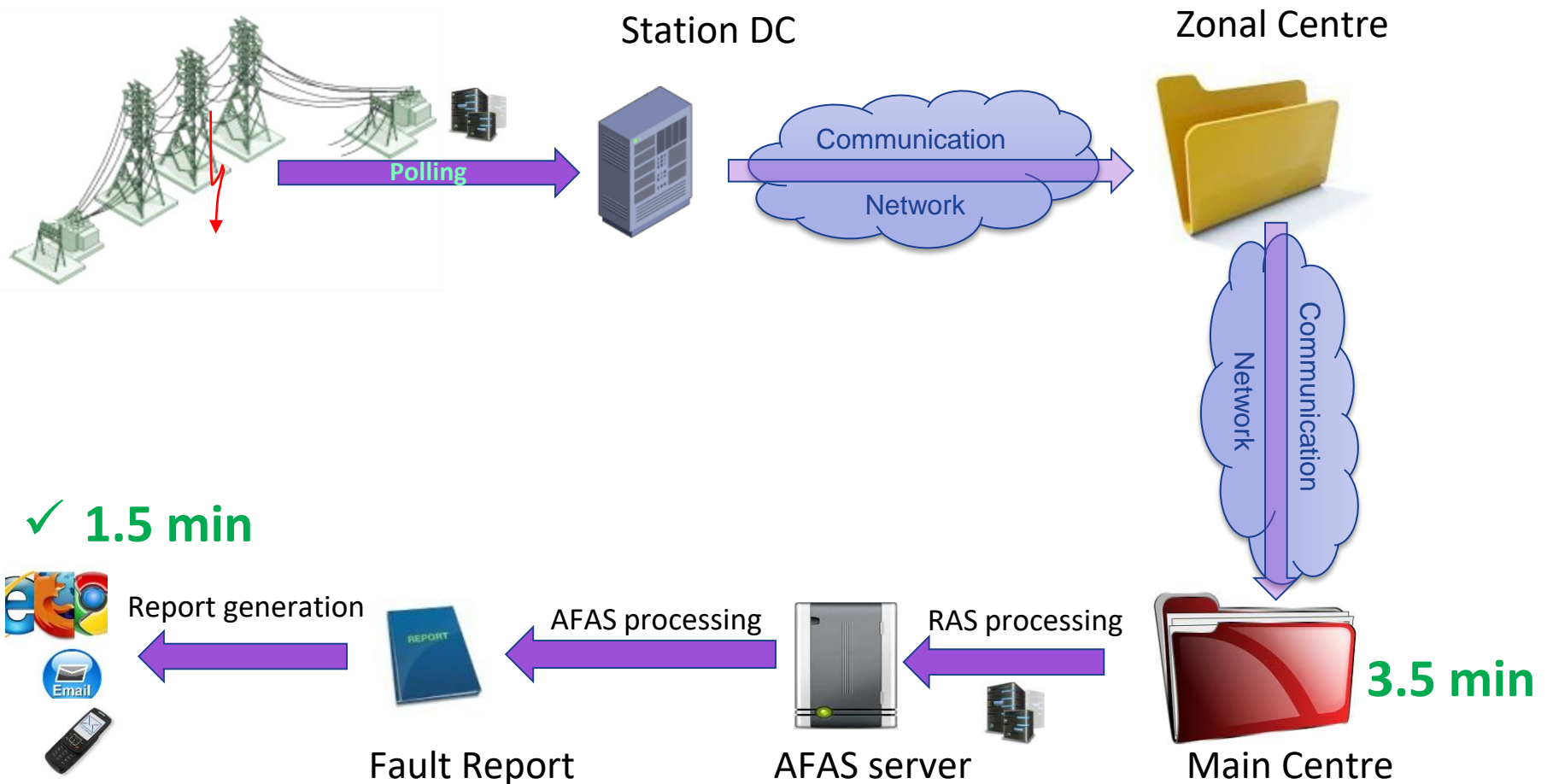


# MiAFAS – Modes of Operation

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- Online:
  - Analysis is done Automatically
  - Reports are generated Automatically
  - SMS and email alerts
- Offline:
  - On-demand execution of selected files
  - No SMS and email alert

# Typical Response Time



Fault to operator Intimation in just **“5 min”**