NEW TECHNOLOGIES & NEW CHALLENGES

Next Generation SCADA/Distribution Management Systems

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Thanks to ISGF

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Introduction

Distribution Management System (DMS):

"Automatic Monitoring and control of Distribution level assets for better reliability, flexibility and agility of the system that uses a network of sensors and control devices"

Early to late years of 20th Century:

- Electric grid was overbuilt in developed countries. DMS was considered a luxury for already 'gold-plated' grid.

- Adding more control systems were thought to be adding risk to the reliability of the grid

- Moreover, DMS was not incentivized by the traditional regulatory structures and rates

- Automation of the grid was mostly limited to Supervisory Control and Data Acquisition (SCADA) at Transmission and Sub-Transmission Substations

- Limited Feeder Automation (Primary side Capacitor Control: pre-programmed)

Challenges in 21st Centuries

- Capital expenditures have been continuously being threated to get axed – resulting 'aging assets'

- Ever increasing load demand and variety of load

- Customer-cited Distributed Generation – Variability and Intermittency

- New Smart <u>Stand-Alone</u> Technologies started pouring in. Ex:
  - Pass data collected by smart sensors to substation controller
    - Applications are running in the controller to make intelligent decisions
    - Intelligent Decisions are conveyed to Distribution Management System
  - Locate Faults to accurately roll trucks – Crew Management
  - Achieve Distribution System Resiliency – Outage Management System
    - Prevent, Recover and Survive any type of outage
  - Increase Energy Efficiencies – Distribution Management
    - CVR/VVO
  - Power Quality – SCADA
  - Unplanned Outages – Outage Management System
  - Customer Service – Trouble Calls, IVR system

DISTRIBUTION UTILITY MEET
Eros Hotel, Nehru Place, New Delhi, India

Challenges in 21st Centuries

- All these smart stand-alone technologies making marginal improvement individually, with lots of duplicate and manual activities.

- Interoperability with standard protocol was sought to integrate stand-alone technologies

    - Integration of disparate applications

    - Make them as a single system to achieve larger improvement

- Cybersecurity, network management, device management, and firmware upgrades – all managed by IT, but these are essential for smooth operations of OT.

- Absence of Common tools, operating principals, and siloed areas of responsibility posed challenges

- Managing Big Data Volume generated from AMI, Connected Field Devices

New Generation Distribution Management System

Overcoming these challenges, A New Generation Distribution Management System is needed that would break down silos between IT & OT and support an integrated SCADA, DMS, OMS and Edge Systems architecture to provide
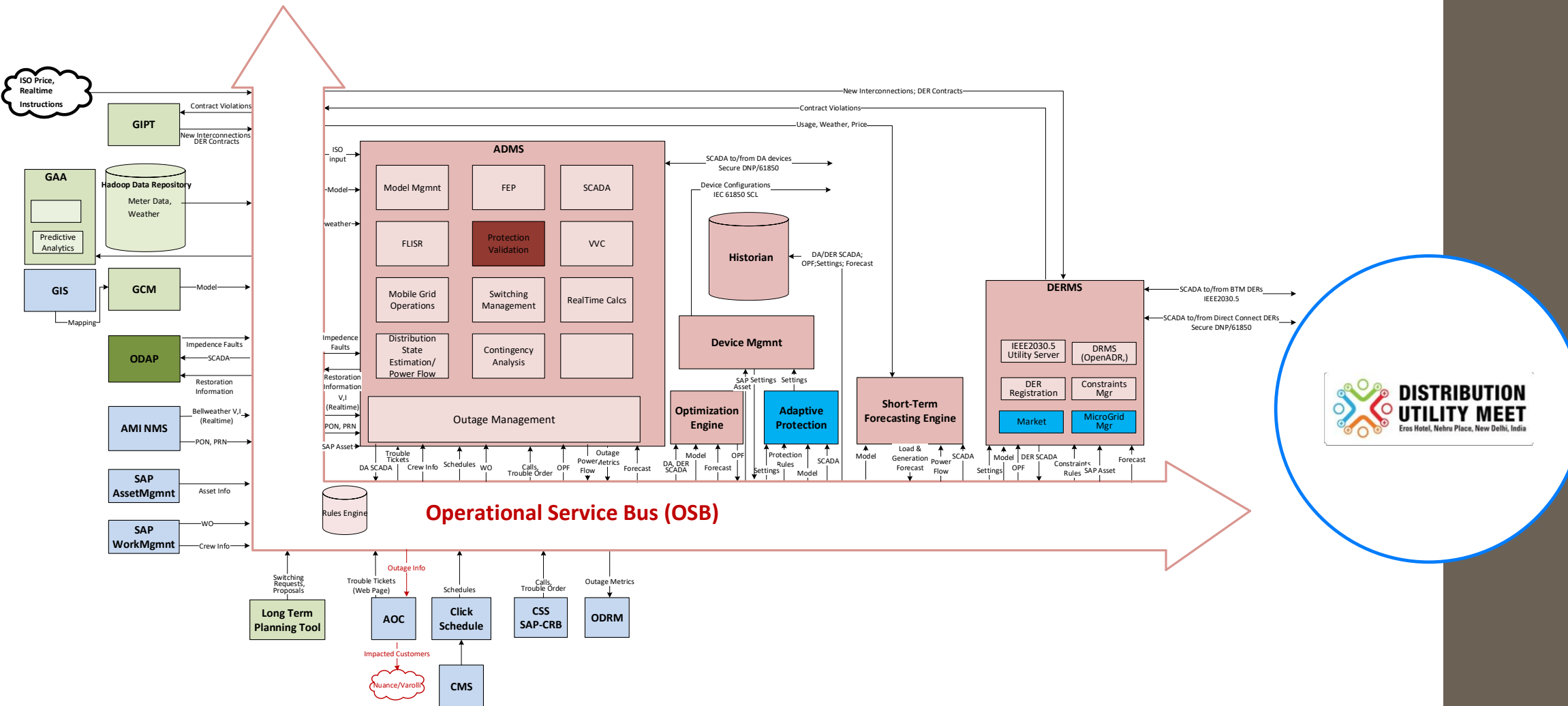
- reliable,

- resilient,

- efficient and

- secure electric delivery system

with the ability to

- withstand outages,

- maintain high quality electric service,

- recover from extreme weather events, and

- save energy.

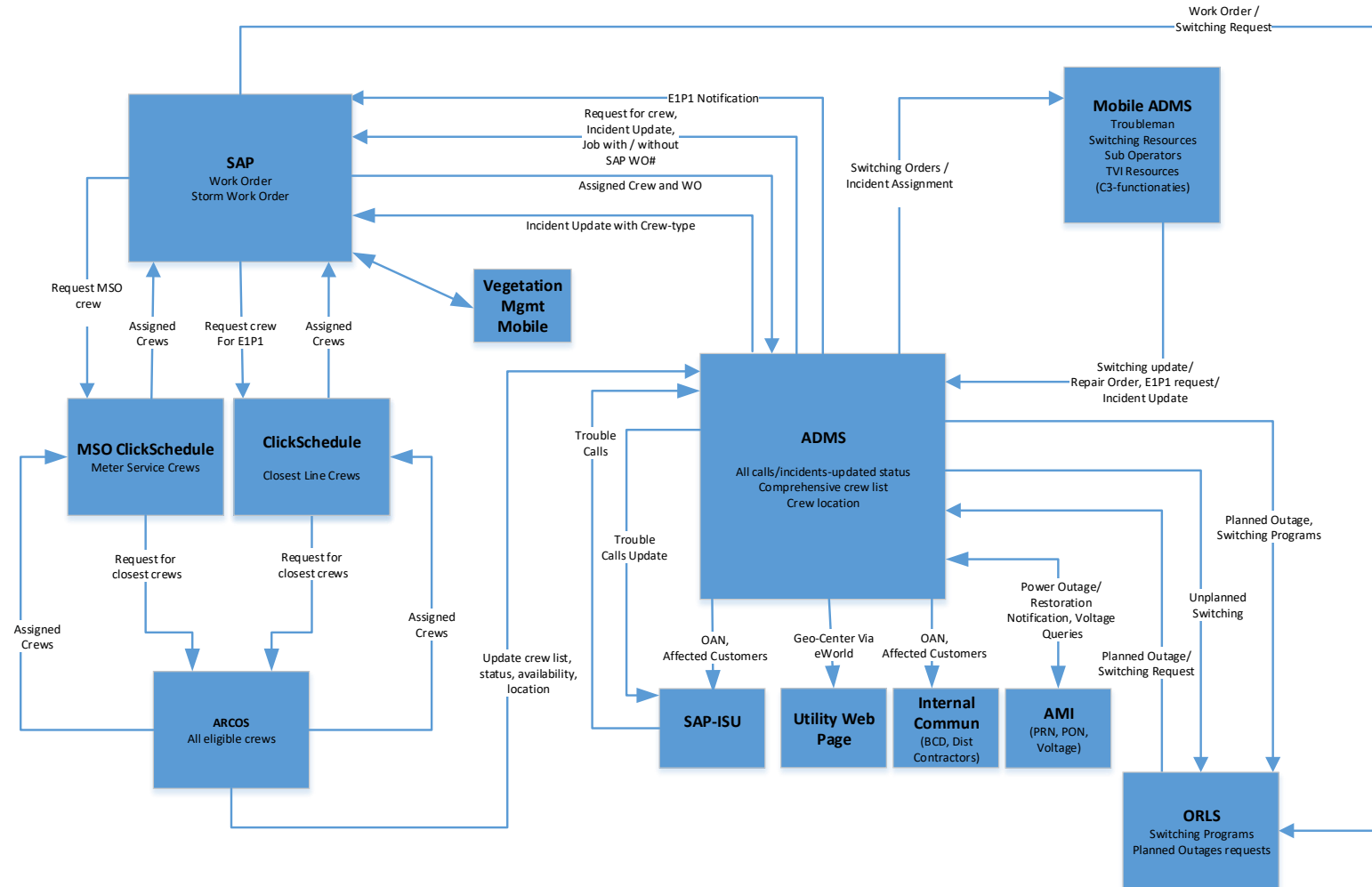- provide real-time analytics on-premise or cloud based data

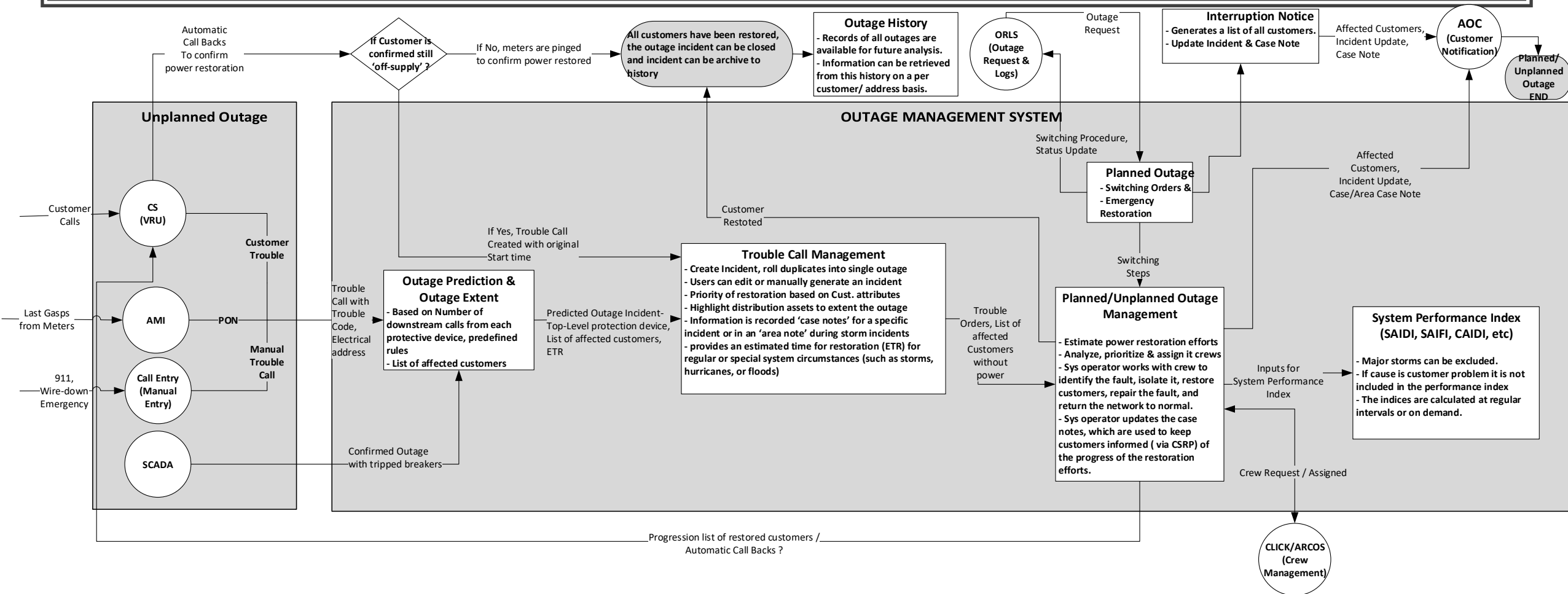# A schematic Architecture of a New Generation DMS

The **OSB** enables integration of disparate applications using a common set of synchronous and asynchronous services defined as **Common Service Definitions**.

Systems and Data Flow for ADMS System

Outage Management System

Thank You
Q & A