



DER Control & Communication Options

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Primary Objectives

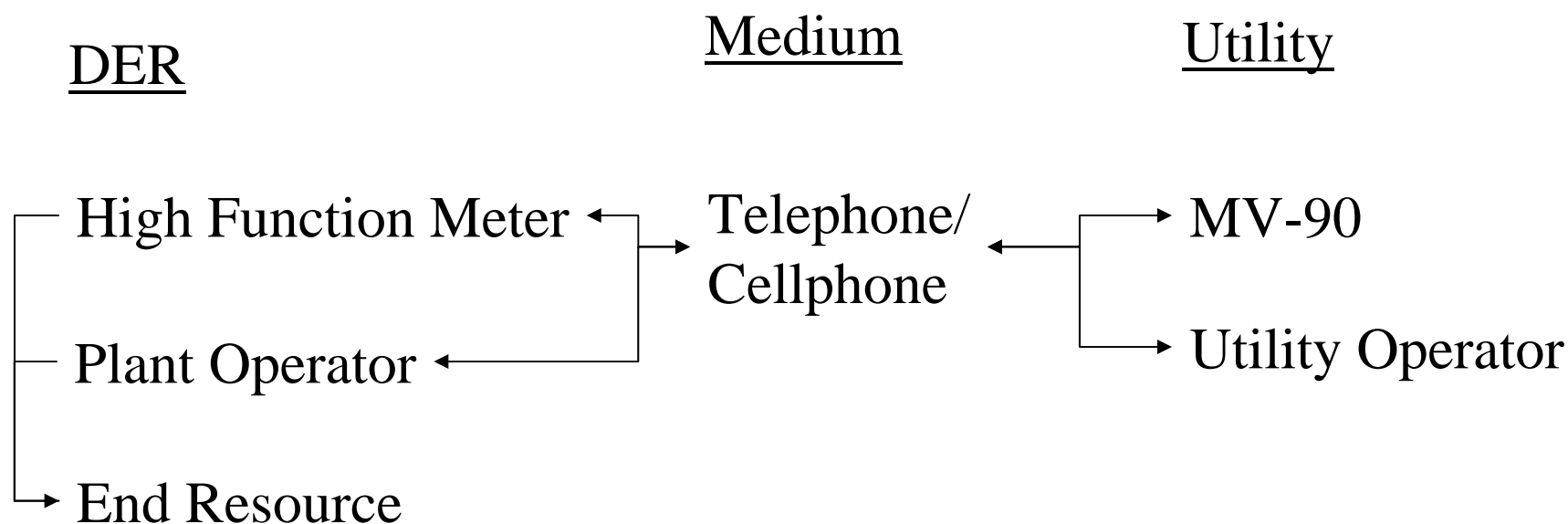
- Monitor
 - Maintain timely information concerning the status and operation of resources
- Communicate
 - Send and receive system data, system events, equipment information, programming and control commands
- Control
 - Provide ability to issue control commands to end devices to command primary and if appropriate backup resources
- Record
 - Record all pertinent information concerning the performance and impact of DER equipment both on the local installation and on the distribution system



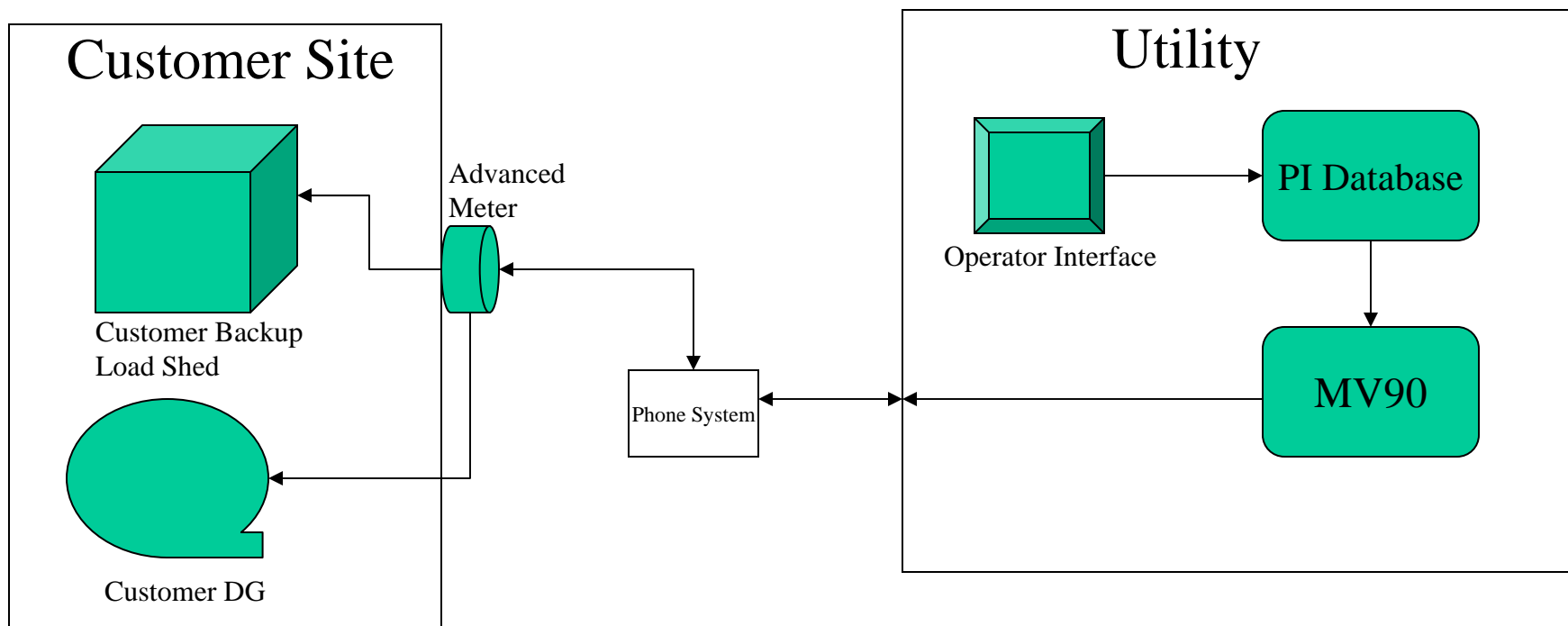
System Configurations

- Basic Level System (for use in applications of limited size, i.e. <100 kw)
 - Provides monitoring and control on request through electric meter based equipment
 - Data collected periodically and on request
 - Primarily based on phone communications (either hard wire or cell service)
- Advanced Level System (for use in large scale applications, i.e. >1000 kw)
 - Provides real time monitoring and control through a remote terminal unit (RTU)
 - Has ability for automated response (local programming of predefined response to certain events)
 - Data is globally available (Utility and ISO-NE through use of ICCP data links)
 - Based on either phone or radio communication systems depending on Utility infrastructure capabilities
- All equipment specifications must be Utility/customer specific particularly RTU, meter and communication medium selections

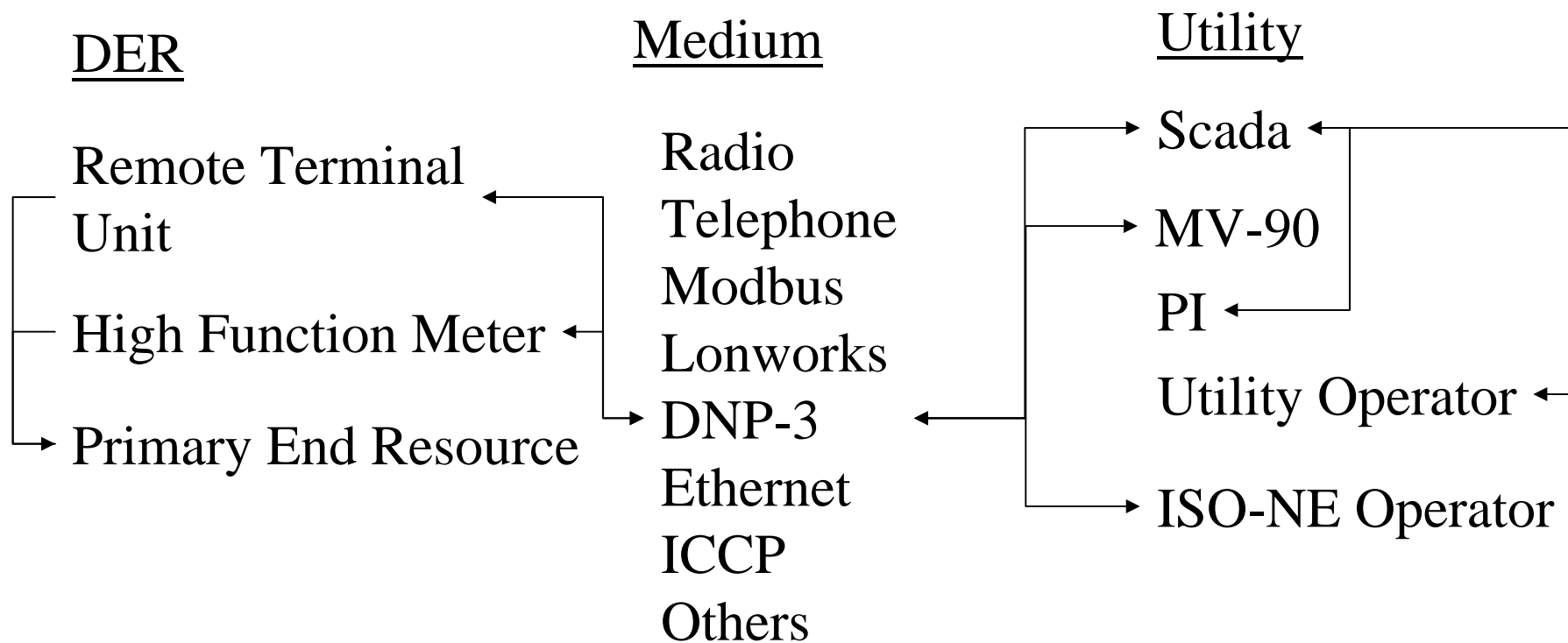
Basic Level System



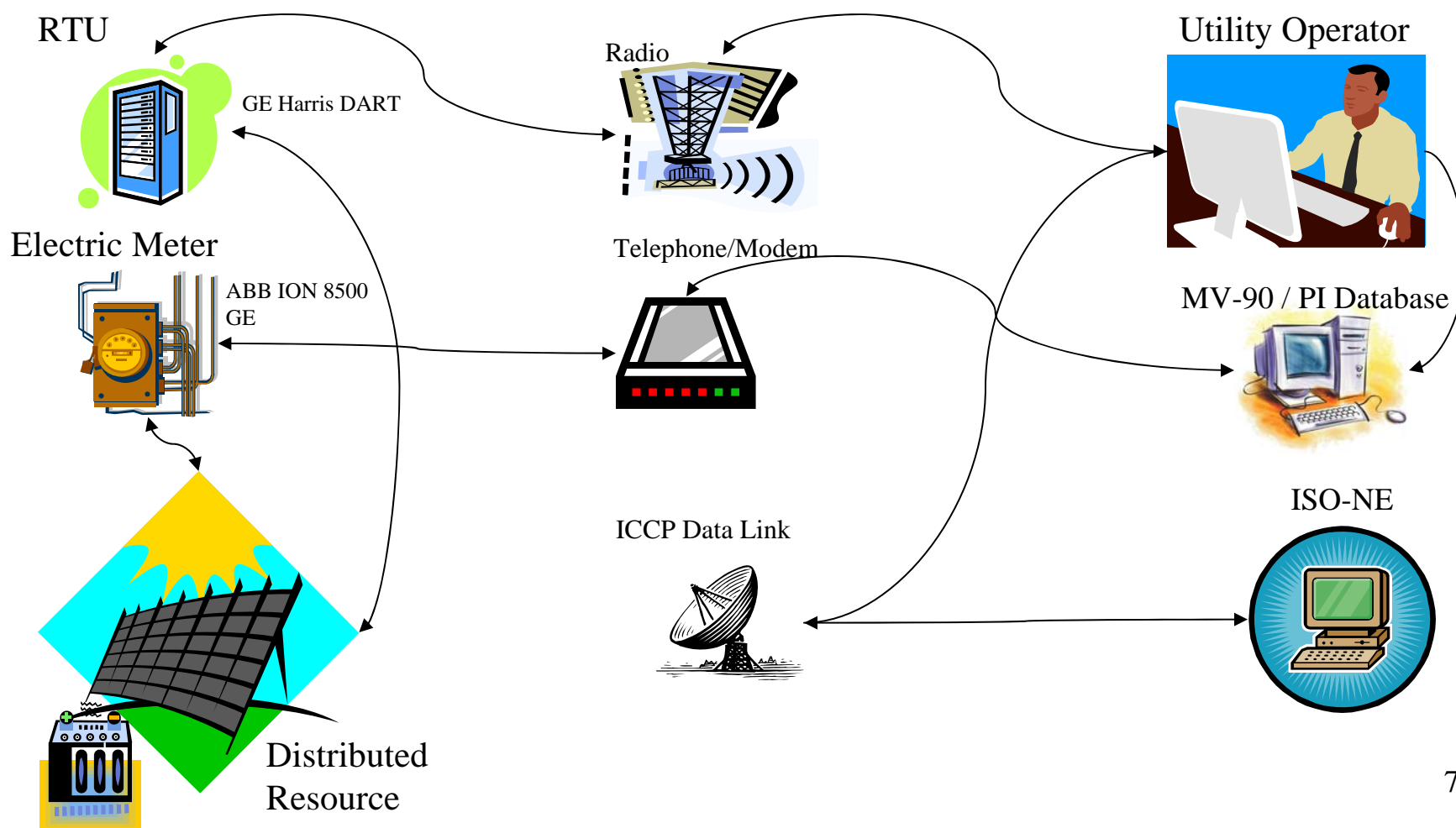
Basic Level System Example



Advanced Level System



Advanced Level System Example



Suggested Recording Data

- Data recorded by metering devices should include but is not limited to:
 - Kwh and Kvarh quantities on 5 or 15 minute interval basis
 - Resource output, customer load, utility delivery/receipt, feeder loading
 - Voltage quantities
 - Max/Min, Sag/Swell events, unbalance voltages, customer voltages, feeder voltages
 - Power Quality quantities
 - Harmonic V&I, THD, flicker, V&I wave forms
 - Event Driven Performance
 - DER response to fault conditions, ride through response, startup times, equipment failure events