

**Your Global SCADA &
Telecommunications Partner**

**Motorola MDLC Protocol
Introduction**

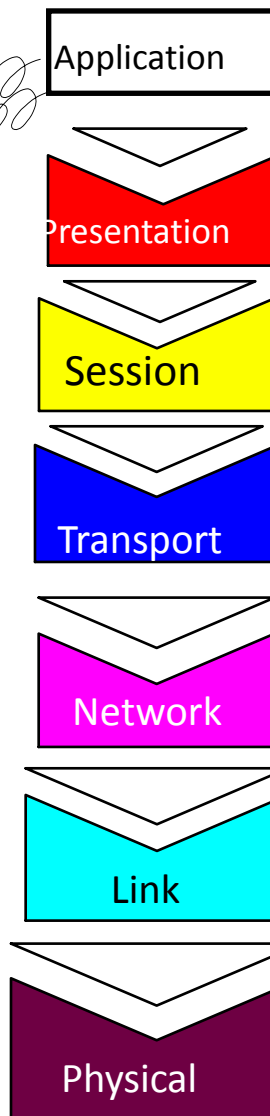


MDLC - Wide Area Network 7 Layer Protocol

- Packet Switching
- High Data Transmission Rate
- Error Detection
- Adjusts itself for short or long messages
- Routing of data in complex networks
- Simultaneous “sessions” on one physical link

OPTIMIZED FOR SCADA

Functions of the MDLC Protocol Layers

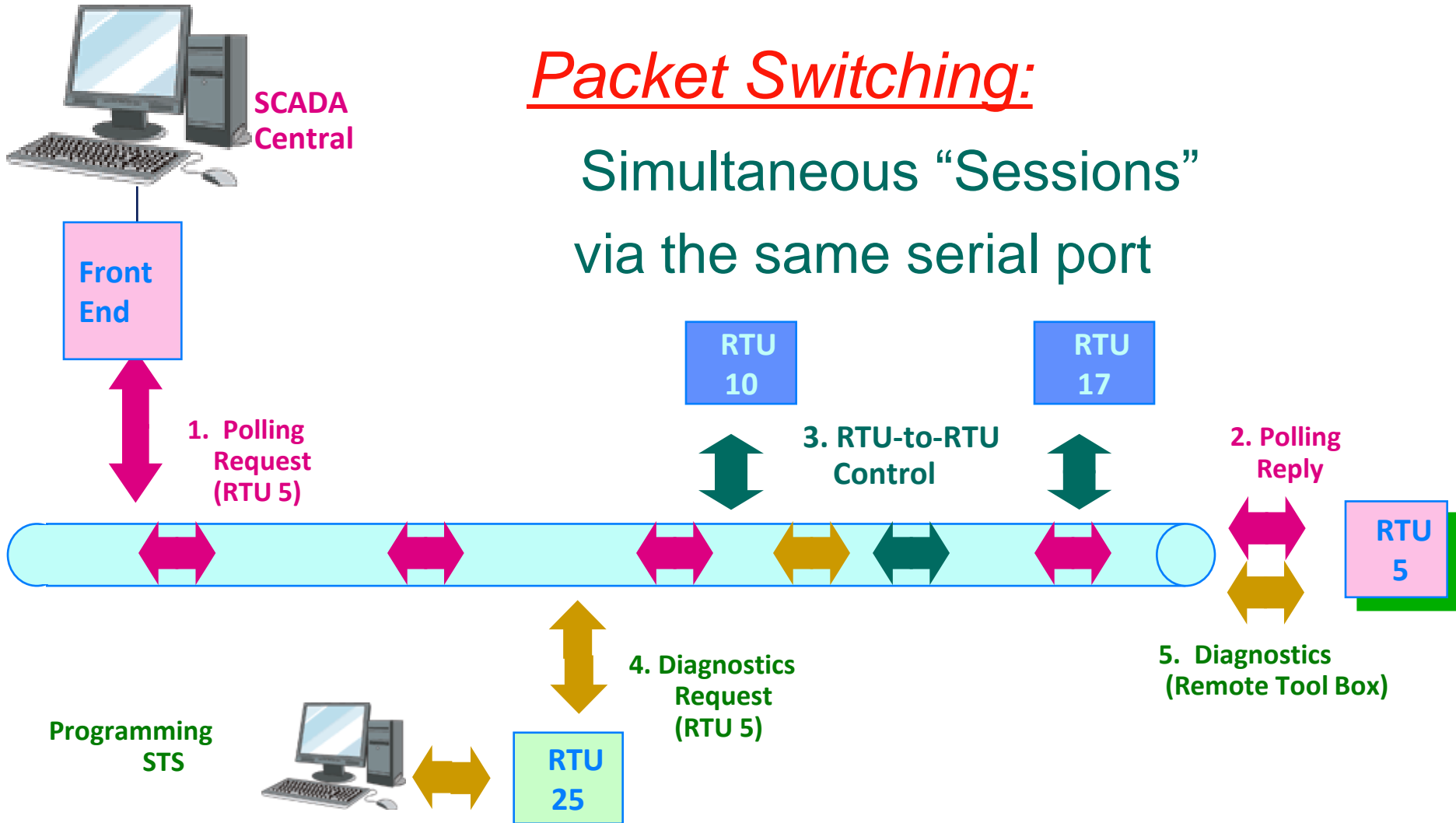


- The actual content of the message.
- Functions required to maintain the SCADA System: Polling, Control, Events, Diagnostics etc.
- **Format Conversion**
- **Compression, Encryption and Authentication**
- **Session control and message synchronization**
- **Ability to conduct several sessions simultaneously**
- End-to-end flow control
- Sequencing and acknowledgment of “complete data”
- Multiplexing of logical channels
- Data routing (among different types of links)
- Network layer addressing (“source”- “destination”)
- Communication fail handling and re-routing
- Frame sequencing and acknowledgment
- Link layer addressing (“From”-“To”)
- Channel access priorities
- Bit/byte level encoding/decoding
- Channel access and media interface: Radio, RS-232, RS-485, IP based, etc.

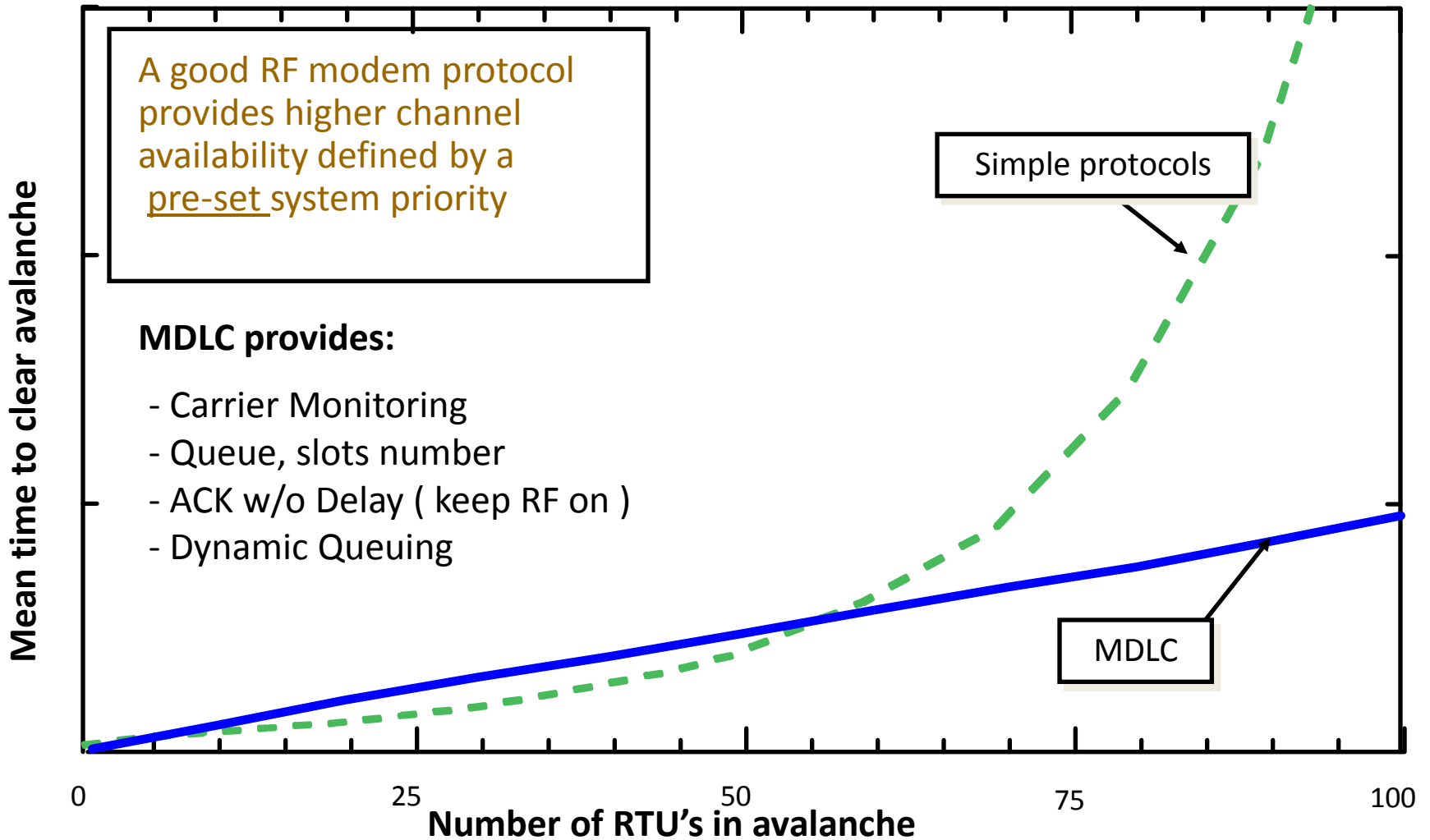
Multi Tasking Communications

Packet Switching:

Simultaneous “Sessions”
via the same serial port

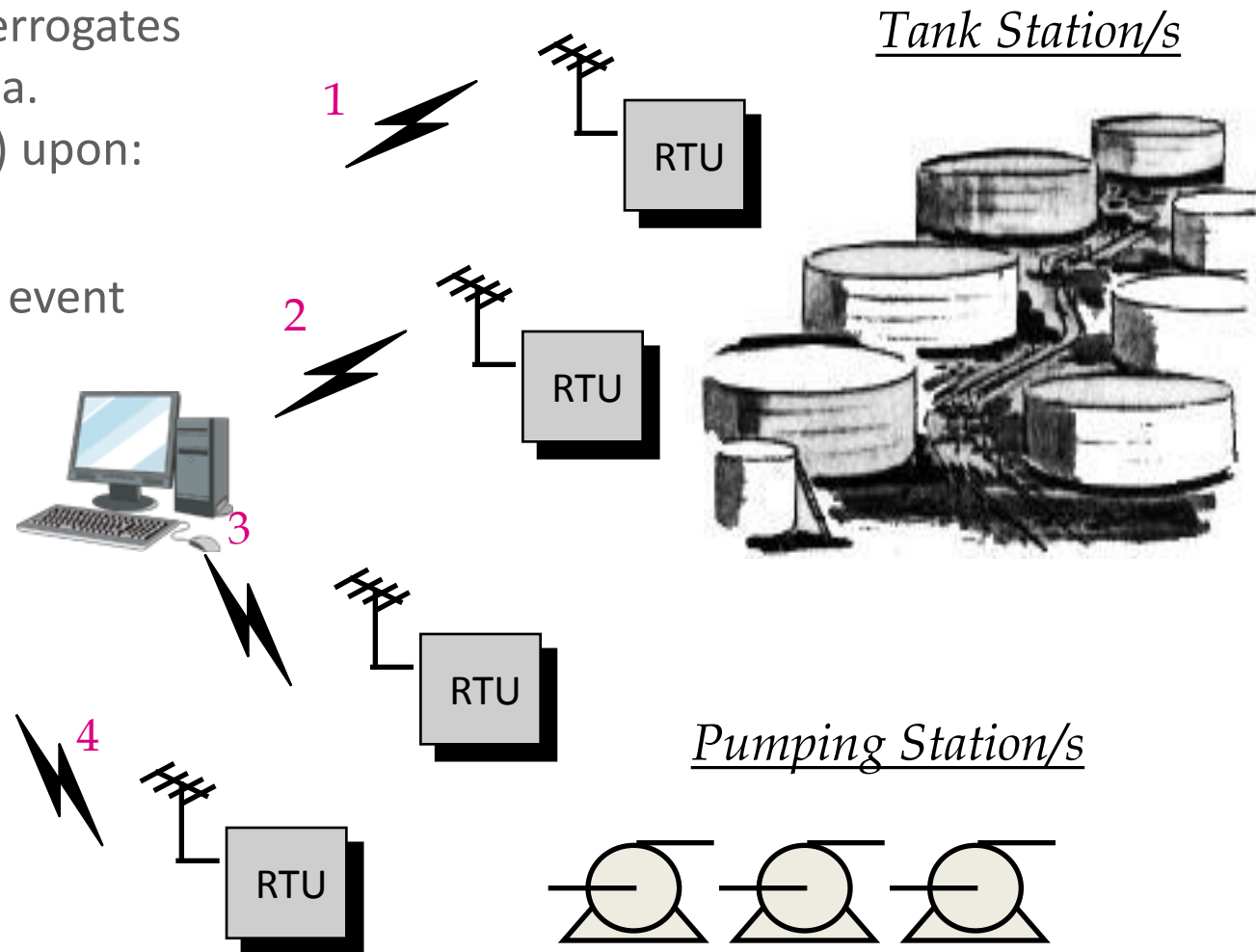


Channel Access Mechanism



Communication Methods - Polling

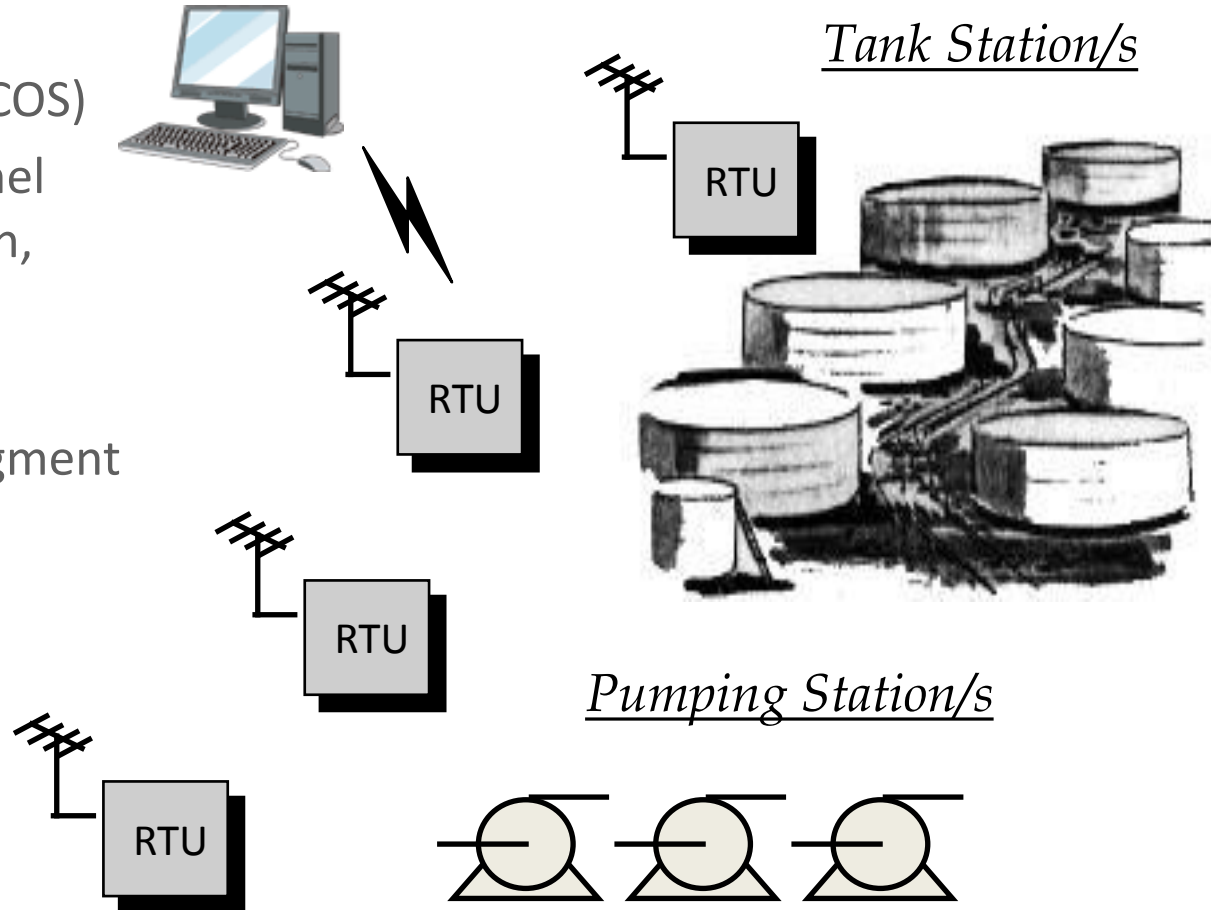
- The Control Center interrogates (polls) the RTUs for data.
- Polling Schedule (cycle) upon:
 - Scheduled time
 - Operator's request event



Communication Methods – Contention (“Burst”)

- Autonomous report of an RTU to the Control Center

- Upon significant event (COS)
- Transmission cycle: Channel Monitoring, Transmission, Acknowledgment
- Possible Collisions
- Retries if no Acknowledgment



Communication Methods - “Polling of Exceptions”

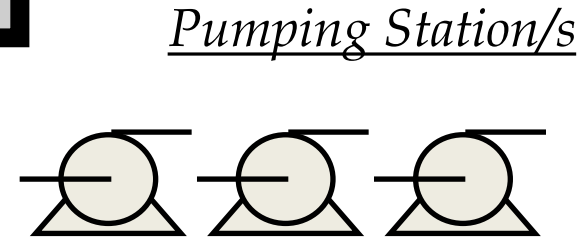
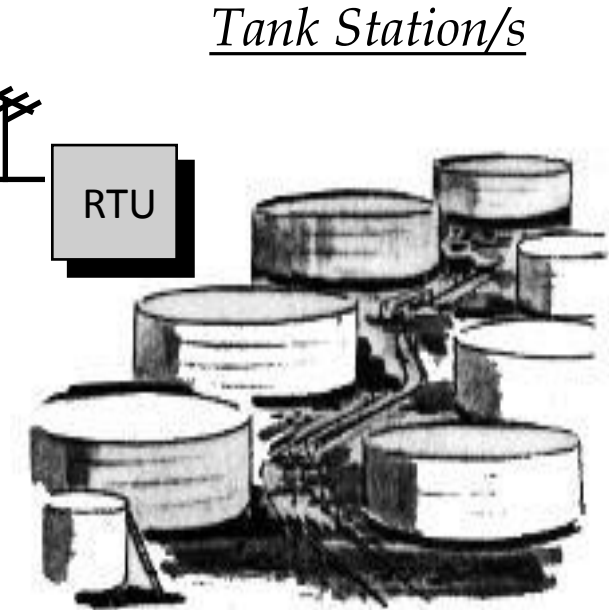
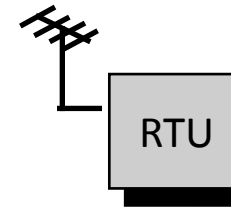
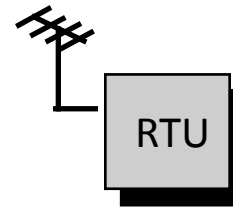
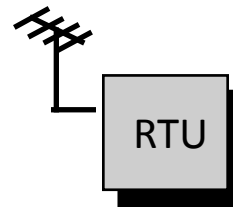
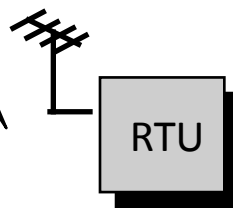
- Polling (initiated by Control center)
- The reply contains only new data (upon COS = change of state)



Poll Request



Reply (COS)



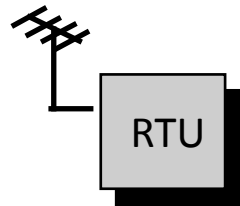
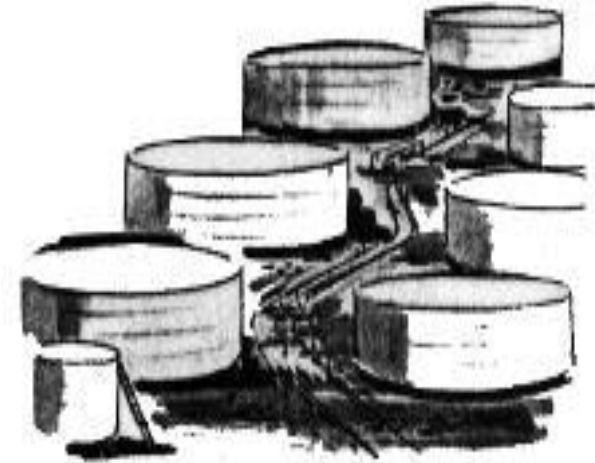
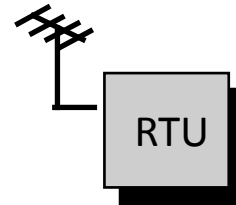
Communication Methods - RTU-to-RTU

Tank Station/s

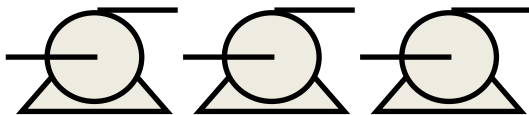
- A message from one RTU to another

Example:

- A “control” message to activate a pump, upon detection of low level in the storage tank



Pumping Station/s

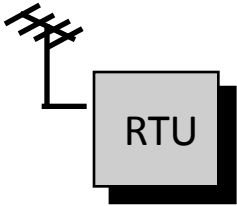
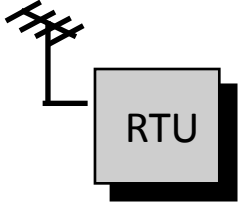


Communication Methods - "Store & Forward" Routing ("Data Repeater")

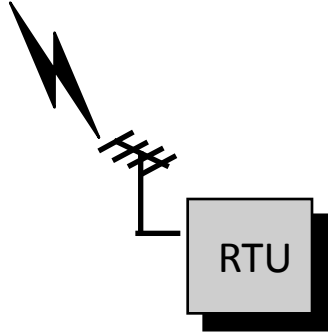
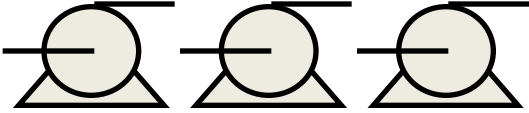
S&F "Repeater"

Tank Station/s

All radio links use the same frequency !



Pumping Station/s



Pumping Station/s

