DATAREMOTE MOVING DATA OVER WIRELESS

Case Study

Florida Utility Communications Network Dramatically Increases Network Availability

A major Southern Florida Electric Utility owns and operates a utility operations dispatch and trunked radio system which covers its service territory. The P25 trunked radio system utilizes T1 channels for connection between tower sites and regional control centers. Utility workers from various departments within the utility utilize the radio network for operational and maintenance dispatching of personnel. In addition, the radio network is used during major events and instances of service recovery and outage restoration. The same network supports some command and control aspects associated with substation, distribution and transmission delivery controlled by the utility Supervisory Control and Data Accusation (SCADA) system. All users and applications rely on the hardened radio system for critical utility command and control, operation, maintenance, restoration and emergency communications.

To ensure a high availability of service, the utility company's engineers focused on minimizing service interruptions caused by wireline and fiber provisioned T1 circuit outages. In the event of a T1 failure, operators wanted the circuit to automatically switch to an alternate path on a different access network. Cellular, with its increasing speed, capacity and reliability, was determined to be a viable solution for this backup path. However, next generation 3G/4G/LTE cellular networks are packet based and don't support native T1 circuit transport. The engineers needed equipment that would convert a T1 signal to IP, and automatically switch to the cellular path when the primary T1 failed.

DataRemote has integrated the ability to combine an IP-Tube circuit emulation solution with a cellular radio appliance. This combination of equipment proved to be just the solution the utility engineers were looking for. Previously, engineers had successfully used the IP-Tube circuit emulation solution for automatic protection switching of T1 communications over satellite links. It was discovered that a similar solution would be effective for cellular backup/failover of the critical P25 utility radio network. DataRemote utilized a partner's **IP-Tube** T1-over-IP solution integrated with a cellular radio appliance to encapsulate TDM data into IP packets for transmission over a cellular data IP and Ethernet connection. The IP-Tube uses circuit emulation to transparently transport T1 voice and data via a cellular data channel thereby enabling interconnection of T1 based PBX/Voice, utility mobile radio (LMR) and WAN router equipment over packet-based, cellular data IP links.

A **Link Protector** option expands IP-Tube T1-over-IP functionality, adding auto protection switching and eliminating manual intervention in the case of a T1 outage.

Under normal operation, IP-Tube with Link Protector functions in a PassThru (transparent) mode, continuously monitoring the quality of the primary leased T1 connection. In the event of a T1 outage, the IP-Tube immediately detects the failed connection, switches from PassThru mode to T1-over-IP mode, and routes customer T1 traffic over a cellular data channel IP link.

In the utility radio application, IP-Tube equipment is installed at the radio tower sites and at the regional control centers. The primary T1 trunks, linking tower sites back to the regional control centers, are monitored for quality on an ongoing basis. If a T1 link drops below customer configured performance levels, the IP-Tube automatically switches tower traffic over the cellular network, restoring T1 connectivity between the tower and the regional control center. See Figure 1.

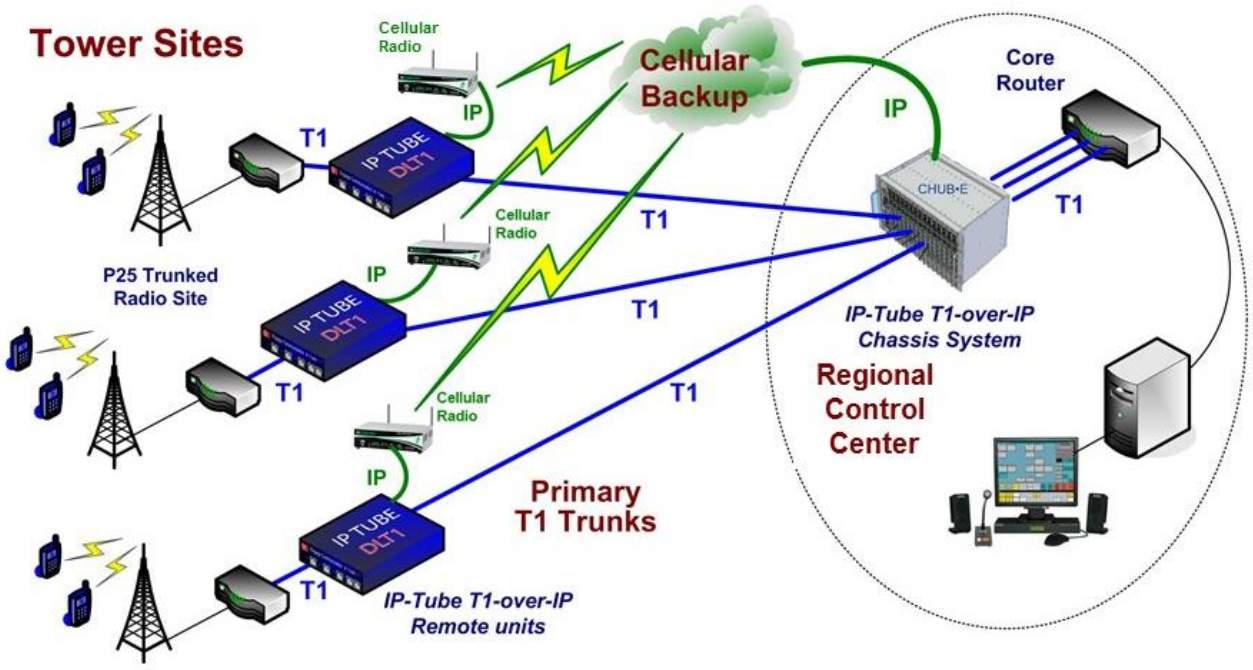


Fig 1 – DataRemote integrated IP-Tube provides Auto Backup of T1s over Cellular Network

- *Under normal conditions, IP-Tube provides PassThru of Primary T1, monitoring the primary T1 path*
- *Upon T1 outage, IP-Tube routes T1 traffic over Cellular network, immediately restoring T1 connection*

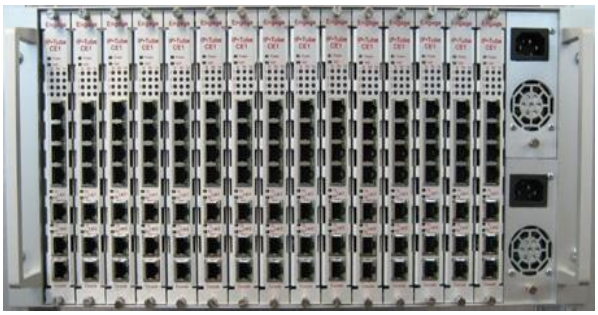
The IP-Tube automatically switches back to the primary T1 trunk when service is restored. With the IP-Tube again in PassThru mode, the utility radio traffic is returned to the primary T1 trunk. The primary T1 is monitored for future outages, and the cellular connection can be returned to standby mode.

IP-Tube T1 units are available in standalone configurations for deployment at remote tower sites, and in chassis versions for aggregation at regional control centers.

IP-Tube circuit emulation solutions from DataRemote offer a number of specialized features which help to ensure a high quality T1 connection over the cellular network:

- Lossless Data Compression reduces Ethernet bandwidth by eliminating idle and redundant data, minimizing cellular bandwidth requirements
- Far-End Echo Cancellation suppresses echo in PBX and other Voice applications
- Assured Delivery Protocol greatly improves on UDP best-effort transport used in TDM-over-Ethernet products by enabling retransmission of dropped packets as well as packet out-of-sequence correction
- Transparent TDM over IP mode ensures all customer traffic types can be carried over the emulated T1 circuit
- Alternatively, the HDLC-over-IP protocol makes efficient use of cellular bandwidth for WAN router traffic.

The availability of higher capacity/higher reliability cellular networks and IP-Tube T1 Circuit Emulation makes it possible to significantly improve availability for critical utility communications networks. This led to greatly reduced down time resulting in quantified lower operating costs and an overall savings in manpower.



DataRemote CHUB-E Chassis with IP-Tube – 15 slots

DataRemote Cellular Router

Standalone IP-Tube Unit

Since 1991 DataRemote has developed and delivered specialized Networking & Telecom wireless and cellular products for mission critical applications to the Public Safety, Enterprise, Government, Defense, Utility, and Education markets.

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