Chase Controls Corp

Manufactured By IDX Inc.

ChaseNet Wireless Communications Solutions

ChaseNet SCADA solutions can combine multiple wireless and wired data communication methods to offer a real time monitoring and control SCADA telemetry system. Radio, Dial-Up, Satellite, Cellular, Wired Ethernet, and Fiber networks all can share data, to provide the easiest, most cost effective SCADA communication solution. The following pages describe the secure structure of the ChaseNet Private Network Tunnel (PNT) Wireless Cellular component of our network.

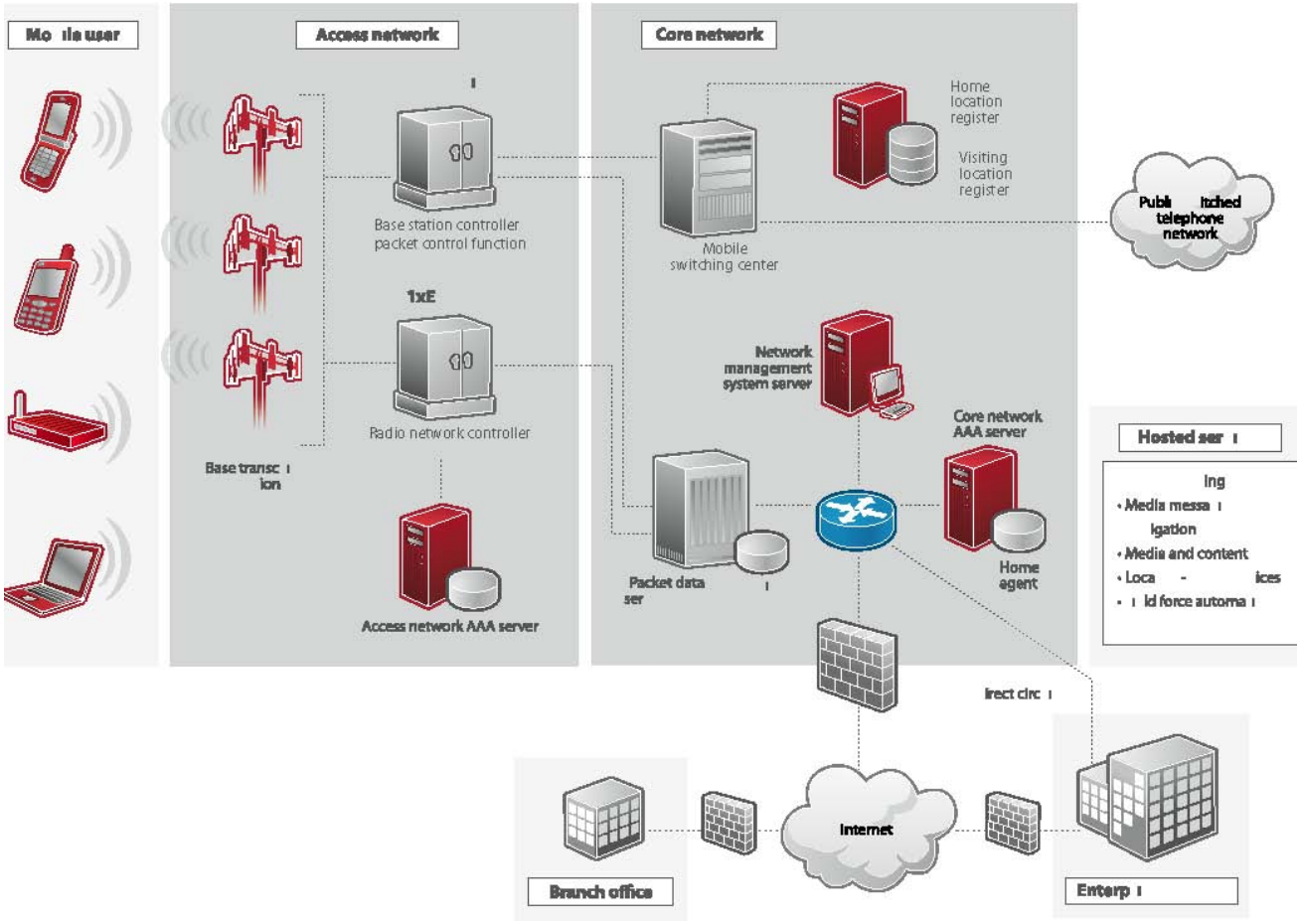
Cellular Wireless Communication Overview:

Chase Controls Corp. utilizes the CDMA2000 or IS-2000 cellular data network standard. The CDMA2000 wireless air interface standard is known by many terms, including: 1x, 1xRTT, IS-2000, CDMA2000 1x, and CDMA2000. The designation 1xRTT is frequently used to identify the version of CDMA2000 radio technology that operates over 1.25-MHz radio channels (one times 1.25 MHz). The first phase of CDMA2000 is called 1xRTT. 1xRTT provides maximum theoretical data rates of 144 Kbps (downlink) and 144 Kbps (uplink). Subsequent phases of CDM2000 post-1xRTT introduced EV-DO Rev. 0 and Rev. A with much higher throughput speeds. 1xRTT is commonly referred to within the industry as being 2.5G technology. EV-DO Rev 0/Rev A are 3G technologies. LTE is the basis for the fourth-generation (4G) CDMA wireless data network. 4G networks are comprehensive IP solutions that deliver data solutions almost anywhere, and offer greatly improved data rates over previous generations of cellular wireless technology.

Mobile WCU Modem:

In a typical network setup, users experience a data network through their WCU modems. However, it is common to have wireless routers supporting the access needs of customers. This is the subscriber's point of entry for network access, and system-wide applications for using SCADA data. In terms of the network, WCU modems are the mobile stations that function as a mobile IP client in a CDMA2000 1x and EV-DO network. Mobile stations consist of a radio, baseband processor, and a general-purpose processor for interfacing to a hosting computer or industrial controller.

The mobile station radio and baseband processor interact with the radio access network (RAN) to obtain radio resources in order to exchange packet data. The mobile station tracks radio resource status states such as active, standby, and dormant. The mobile station also accepts packets from the hosting computer when radio resources are not available or cannot support data flow to the network.



Radio Access Network

The RAN is the subscriber's entry point into the wireless cellular network. It's here that the CDMA2000 Wireless data network differs from a typical network setup. This part of the cellular network is responsible for delivering packet services for 1xRTT and 1xEV-DO connections, making it possible for users to expand their mobility, experience better access, and deploy system-wide applications.

The RAN maps the WCU station to a unique link layer used to communicate with the Packet Data Serving Node (PDSN) in the core of the network. The RAN must validate the WCU station for service and maintain the communications link between the WCU station and the network core. The RAN facilitates security by allowing only authorized WCU stations to access the core network. The RAN comprises the following key elements:

Base Transceiver Station

The base transceiver station (BTS) is physically composed of antennas, towers, and sophisticated electronics. These all work together to control the air-link and act as the interface between the network and WCU stations.

Radio resources are also managed by the BTS. Radio resources include the radio frequency and channel assignment for each mobile station, the power level of transmit and receive signals, antenna sector assignments, and signal separation.

The BTS manages back-haul connections to the base station controller (BSC) in order to minimize redundant traffic and traffic delays. The communications protocols used between the BTS and BSC are proprietary.

Base Station Controller

The BSC acts as a link for packet-switched data messages between multiple BTS units. The BSC is also responsible for mobility management and handoffs between BTS units that are within its domain. It handles the overall call control process. The BSC connects to the core of the network using connectivity options that vary depending on whether it is voice, data, or signaling information.

Packet Control Function

The packet control function (PCF) routes IP packets between the mobile stations connected to its associated BTS units and PDSN. The PCF maintains the connection state between the radio access network and the mobile stations. This connection state ensures an active path for packet data, buffers packets when radio resources are not available, and relays packets between the mobile stations and the PDSN.

Core Network:

The role of the core network is to act as the gateway between the radio access network and the public or private networks that will handle the packet data. It provides connectivity authentication, authorization, and accounting (AAA) services, acts as the gatekeeper for access to hosted and other network services, and manages IP addresses. These functions contribute to the overall ability of the network to offer users mobility and secure access, and to extend applications across the SCADA system.

The core network comprises the following key elements:

Packet Data serving node

The PDSN services the radio access network and acts as the primary gateway into the public or private network, granting users secure access to network data and applications.

The PDSN manages the interface between the BSC and BTS, and the IP network by establishing and terminating the mobile client link layers. The PDSN terminates WCU station Point-to-Point Protocol (PPP) services for the WCU stations it services. It provides IP services for the WCU stations based on the services requested and authorized.

Each PDSN supports simple IP (SIP). When SIP services are provided to the WCU station, the PDSN acts as a standalone network access server (NAS) and can provide SIP services to the WCU station. The PDSN authenticates users locally, or it can forward authentication requests to the AAA server and home agent when users move from one PDSN to another support SIP.

The PDSN records packet billing information in coordination with the BSC and actively manages subscriber services based on the device profile information it receives from the services and AAA servers. The PDSN routes packets to the external public or private networks or to the home agent (HA), which can be secured via secure Generic Routing Encapsulation (GRE) tunnels.

AAA / Home Agent

The AAA server and HA are used to authenticate, authorize, and account for a device's access to the network and network services Home Agent Support Mobile IP.

ChaseNet Private Network Overview:

The ChaseNet CDMA2000 Wireless private network offers many features to help customers manage their data more efficiently, including:

- Support for customer-owned private IP or public IP address assignment.
- Dynamic and Static IP addressing options.
- Data traffic segregation.
- Redundancy support via dual direct connection provides for robust connectivity.
- Managed or unmanaged direct access to the Chase Private IP network.
- Dynamic Network Routing allows SCADA application traffic to be routed directly to its destination (anywhere-to-anywhere connectivity).

ChaseNet Wireless Private Network Securities

ChaseNet private network gives the customer wireless data traffic separation from the public Internet. The ChaseNet private network truly extends their SCADA infrastructure to the wireless WCU modems, connected to the Remote Telemetry Units (RTU's)
Securities of the ChaseNet Private SCADA Network include:

- Enhances workforce mobility by providing flexibility and ease of management, with a secure connection in a single network solution.
- Segregates customer SCADA traffic from public network elements of the Internet and assigns them to customer-specific home agents.
- Routes Remote Telemetry Data to the customer's Master Telemetry location through a dedicated, secure tunnel.

Customer SCADA Master Site IP Addressing Options

A Cisco client end router is configured and provided for the customer Master Telemetry Location, to provide a dedicated secure tunnel to the ChaseNet Wireless SCADA Communication System. A customer provided static IP address is required for external access from the Chase Wireless Private Network router.