



PUMA Capabilities

The primary role of the TelStrat PUMA solution is the elimination and/or reduction of site visits (truck rolls) for the Operations Administration Maintenance, and Provisioning (OAM&P) of remote Network Elements (NE's), however, the PUMA solution provides many more advantages as listed below:

- 1. Reduced Site Visits** – The TelStrat PUMA solution allows a user or technician to remotely connect to the local maintenance ports of all NE types, which normally require a site visit. These maintenance ports come in a variety of physical forms (RJ45, DB9, DB25, wire-wrap pins), and the vendor's maintenance commands are issued in a variety of ways (simple command-line, laptop launched software, browser-based imbedded software).
- 2. Fault Identification and “Smarter” Truck Rolls** – When an alarm is received at a Network Operations Center (NOC), or other operations desk, a trouble ticket and/or dispatch is usually referred to local technicians near the alarm. Rather than immediately roll a truck to the site identified by the alarm, a local technician using PUMA is able to first interrogate the NE in alarm from a central location. This allows the technician, in many cases, to determine whether the alarm is actually being caused by the NE in question, or whether the trouble may be caused by a “far-end” NE connected to the original NE. In addition, by being able to interrogate all of the potential offending NE's (regardless of location), the technician is often able to determine which circuit pack(s) may need to be replaced, and to secure replacement circuit packs **before** rolling the truck. The combination of these two capabilities (which NE, and which circuit packs) eliminates wasted site visits, and thereby allows a shorter repair interval. In still other instances, the technician may be able to identify that the alarm is not serious (can be handled on the next routine visit), or clear the alarm condition remotely, and eliminate the truck roll altogether. In addition, the PUMA system allows for local or regional notification of alarm conditions providing the opportunity for quicker response and reduction of MTTR. The CC-9000 is capable of providing alarm notification to the proper personnel via email, text messages, or calls to a technician's cell phone.

- 3. Remote Circuit Provisioning** – Circuit Provision Centers often must rely on records documents to determine whether sufficient facilities exist for an NE in a given location (plug availability). A prime example would be request for a private-line T1 service, which assignment records indicate should be served from a particular SONET multiplexer (for example a Fujitsu FLM series). The use of PUMA would allow the Assignment Center or Circuit Provision Center to review the equipped status of the FLM, and assign a slot number, if required, for new service. If there are spare facilities in the multiplexer, **it is even possible to establish new service without a visit to the remote cabinet**, by launching the Fujitsu FLEXR[®] maintenance and provisioning software from a desk in the Provisioning Center.
- 4. Inventory Management** – The equipped status of numerous NE's is often available via a simple command-line query. However, these NE's usually require the command to be entered through a serial port at the site (another site visit). The PUMA solution allows a seamless connection to command-line or Telnet sessions for these NE's, and displays the results in a browser window. PICS centers can therefore manage investment records more efficiently, and engineering forces responsible for facilities management can easily determine which NE's may need additional electronics. With specific software scripts, the PUMA System can poll specific network elements and automatically provide the device configuration information in a browser window.
- 5. Better use of Ports and IP addresses** – The PUMA SC-8100 Site Controller performs Network Address Translation (NAT), which allows private Subnets to be established at remote locations. This is especially attractive for use with NE's that require numerous physical connections (such as the Lucent DDM+ shelf), or for locations that may have a combination of NE types, such as Cellular Base Transceiver Sites (BTS). A single IP address at a remote location can be used to access up to 128 NE's per SC-8100.
- 6. Configuration Backup** – The PUMA SC-8100 is capable of retrieving and storing configuration files for numerous NE's. If an NE must be replaced, the configuration database of the original NE can be restored to the new NE without a site visit. This allows a less-skilled technician to quickly replace a defective unit, another technician to re-configure and test the new NE. In addition, all configuration data for both the SC-8100's and their connected NE's is automatically backed up into the PUMA CC-9000 on a daily basis, or by a command from the SC-9000.
- 7. Software Download Capability** – All PUMA SC-8100's, regardless of port size, use the same software load. The latest version of this software load is also stored in the PUMA CC-9000. The CC-9000 Event Scheduler can be configured to push new loads to individual SC-8100's, or to all SC-8100's, on a given day and hour. In addition, individual NE operating system software loads can be easily upgraded by loading the latest NE software version on the SC-9000, pushed down to the SC-8100, and finally downloaded to the individual NE's on command.

- 8. Vendor Software Hosting** – Several NE Vendors require Local Craft Interface by connecting a laptop computer to a physical port at the NE, and launching a software program. Examples include the Fujitsu FLM line of SONET Multiplexers, the Andrew ACT Lite RET Controller, and Ericsson OMT interface. The PUMA SC-8100 allows the option of loading the Vendor’s laptop launched software directly on the SC-8100. The user, then, need not worry about keeping all of the technician’s laptops updated with the latest version of NE application software. A single installation of a vendor’s software onto the CC-9000 is all that is required. The CC-9000 can then install the software onto any SC-8100 that requires it.
- 9. Security Features** – Remote access to an NE at a site requires that a user first log into the PUMA CC-9000 Central Controller (CC). The CC-9000 typically resides within a private corporate network, and is therefore not accessible by “the public”. Each user is assigned a specific User ID and password by the Administrator. Users are given access privileges, based on job responsibility. For instance, a user needing only to know the equipped status of an NE (such as for inventory management) can be assigned the right only to access that information, while a technician with the responsibility to troubleshoot and repair can be given broader access. In addition, NE’s connected to each SC-8100 are assigned network addresses on a private subnet, proving an additional layer of security. Finally, both the SC-8100 and the CC-9000 can be set to only accept communication from specific MAC addresses, if necessary.
- 10. User Activity Logs** – The activity of each user who accesses the CC-9000 is logged while that user is connected to the system. The Administrator can review which NE’s at which SC location are accessed by which users, and for how long. This capability provides an activity trail in the case of network outage or difficulties resulting from improper procedures. This capability allows for corrective action to be taken to prevent future occurrences of any improper procedures.
- 11. Network Element Polling.** – The PUMA CC-9000 and SC-8100 Linux-based operating software, and MYSQL database allows specialized “scripts” to be easily created to accomplish specific network interrogation. For instance, since DSL is an extremely important revenue-generator for most wireline operators, one of PUMA’s existing customers uses a script to poll each of their AFC DSL shelves at regular intervals to identify alarms on the system. Not only is this data used to notify their NOC of existing alarms, but this information is summarized into a special file, which is then emailed to management personnel on a daily basis. Every morning management receives a report in tabular form, which identifies the NE name, the time the alarm is generated and cleared, and the circuit pack causing the alarm.
- 12. Management Reports** – The database of the CC-9000 may also be queried, using standard commands, to generate a host of reports about the status of the network. Examples would include threshold crossings of Bit Error Rates (BER) of high speed optical components, a report on the performance of microwave radios in a particular market on a given bad-weather day, or a database of all tilt angles for a certain group of RET antennae.

13. Alarm Aggregation Functionality – The inclusion of serial, IP, and alarm aggregation, (including contact closure detection, Form C relay outputs, and analog inputs, both voltage and current) reduce both cost and rack space requirements, and offer a more functional remote site maintenance and monitoring capability at an attractive price.

14. Handling of TL-1 and SNMP messages, including:

- Receiving and forwarding TL-1 messages.
- Translating TL-1 messages to SNMP traps.
- Receiving and forwarding SNMP traps.
- Generating SNMP traps
- Receiving and acting on SNMP MIBS.

15. Integrated RET Controller Functionality – The inclusion of an integrated RET controller reduce both cost and rack space requirements for wireless carriers. Of course, PUMA is capable of connecting to and managing on-site RET controllers as well in the event one is already installed at a site.

16. Video Camera Site Monitoring – The SC-8100 provides for the attachment and remote control of a video camera mounted at the site which can provide added security both for the site equipment, and technicians working in dangerous or secluded sites at night. There are (2) ports on the IP switch module that provide Power over Ethernet (POE) to simplify the operation of video cameras.

17. On Site Storage of events on the SC-8100 – The SC-8100 is capable of storing all activity, including video information should connection with the CC-9000 be lost for an extended period. Once connection with the CC-9000 is restored, this data will be uploaded to the CC-9000 for review

