



TRANSPARENT
TECHNOLOGIES[™]
BEYOND AMR

T2 VIRTUAL NETWORK

Technical Overview

February 2013

System specifications are subject to change

— CONFIDENTIAL —



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Technical Overview

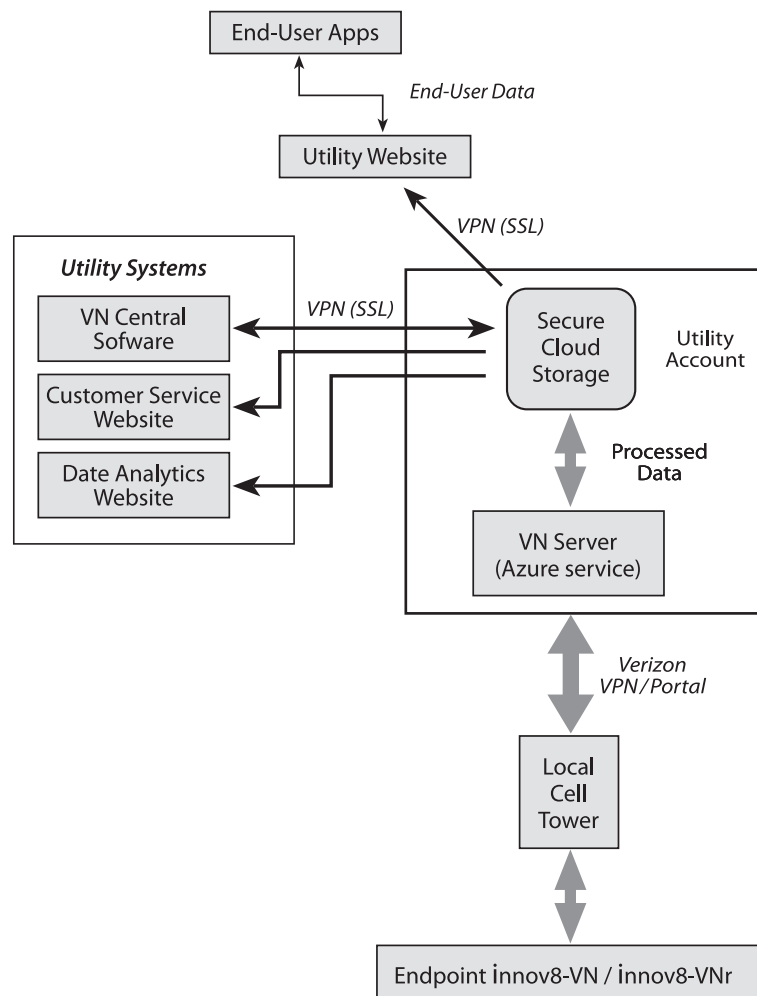
Summary

The VN AMI system from Transparent Technologies is the panacea in a water utility's quest for a simple yet powerful data collection system. The VN system provides all of the desirables of an AMI system::

- Flexible, universal endpoints
- Elimination of costly and cumbersome infrastructure
- Scalable AMI network from an established wireless carrier
- High-resolution interval data
- Flexible choice of MDMS and Storage
- Growing suite of end-user data software

All of these features are available in a system that is immediately deployable, infinitely scaleable and packaged within a single capital expenditure for worry-free, ten-year operations.

The diagram below shows an overview of the system:



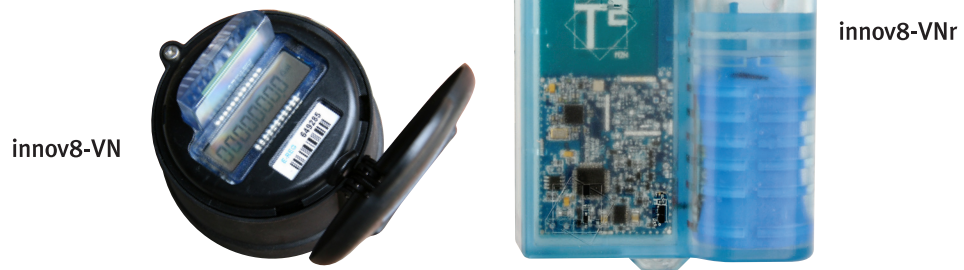


T2 VIRTUAL NETWORK

Technical Overview

End Points

T2 provides two different endpoints for the VN system:
The innov8-VN electronic register and the innov8-VNr stand-alone modem.



The innov8-VN is a fully electronic water meter register with a built-in Verizon network-accessible modem. The innov8 register utilizes a unique magnetic sensing of the meter's magnet to track flow with virtually no drag. This sensing method results in improved accuracy on even used meters. The innov8-VN register can measure and store consumption data down to the resolution of each turn of the meter's magnet. This allows for data transmitted in intervals down to 1 minute. The innov8-VN utilizes advanced algorithms to identify and flag specific consumption patterns such as leaks, high usage, conservation violations, backflow and zero usage/theft.

The innov8-VN can be fitted onto any Metron water meter plus the majority of industry displacement and multijet meters:

- Metron Spectrum and Enduro meters
- Sensus SR-II and PMM meters
- Badger M-series displacement meter
- Neptune T-10 displacement meters
- Elster displacement
- Mueller/Hersey meters (pending)
- Other meter types pending; Check with your T2/Metron representative.

The innov8-VN can be equipped with an integral antenna or a remote antenna suitable for mounting in a pit/vault lid.

The innov8-VNr is a stand-alone Verizon network-accessible modem which can connect to virtually any existing water meter register in the industry. The M2-VN utilizes flexible input circuitry to interface to almost any encoded, pulse or switch based register. The M2-VN has configurable query and data storage intervals to match the register type. Like the innov8-VN, the M2-VN has configurable functions for leak detection, high usage, conservation, backflow and zero usage/theft.

Register Compatibility:

- Metron Hawkeye OER
- Sensus SR-II and ICE
- Badger ADE, RTR and ROM
- Neptune ProRead, Auto and E-Coder
- Elster Scancoder and Switch
- Hersey Translator and Switch
- Plus others; Check with your T2/Metron representative.



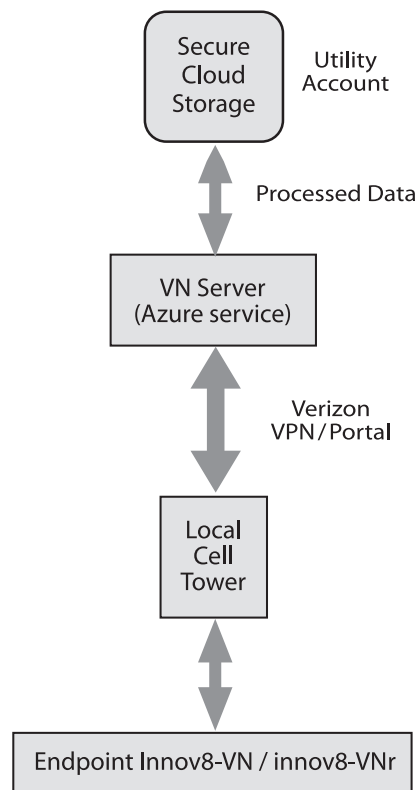
T2 VIRTUAL NETWORK

Technical Overview

Data Communication

The innov8-VN and innov8-VNr endpoints store interval data and consumption flags in the on-board memory. This data is maintained long term (weeks to months, based on the data interval selected) to allow for data integrity and redundancy. The endpoints need to transmit their data to the central storage system. The AMI network, the backbone of the system, is the path from the endpoints to the cloud computing site. T2 utilizes Verizon Wireless' nationwide CDMA network for the machine-to-machine (m2m) communications.

The VN endpoints automatically wake once-per-day, during local super off-peak hours, and connect to a nearby Verizon Wireless cell tower. This negotiation establishes a dynamic IP address for the endpoint on a secure Verizon VPN (virtual private network) and allows the endpoint to communicate on the network. The endpoints only communicate on the isolated Verizon VPN and all data is funneled through the Verizon m2m Management Center portal. This portal is a management tool to monitor the endpoints' modems and to track network data usage.



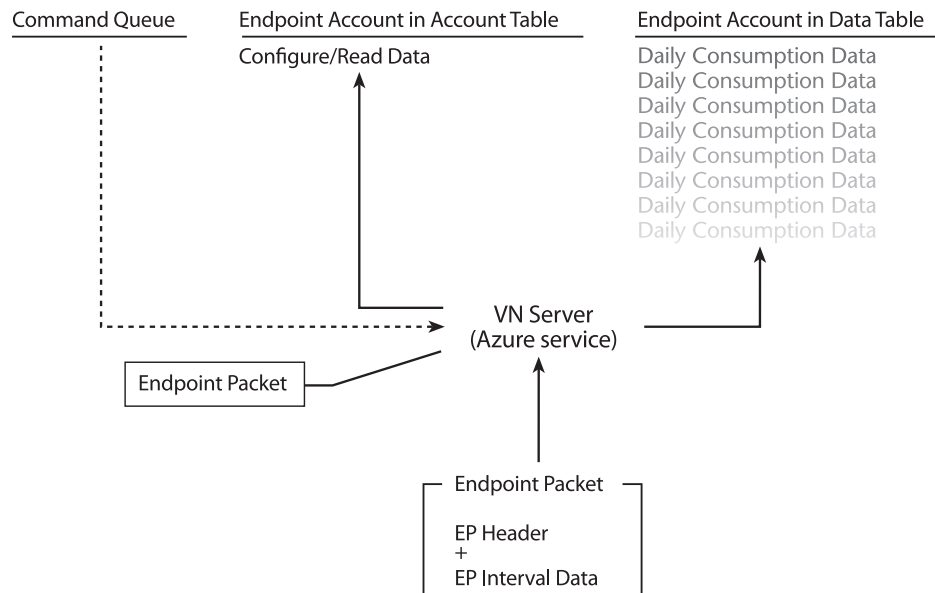
As soon as the network connection is established, the VN endpoint transmits its standard packet to a preset URL/IP address. The data packet includes meter and modem information, diagnostic data plus the daily interval data. Following the transmission, the endpoint waits for either an acknowledgement or for a command from the system.



T2 VIRTUAL NETWORK

Technical Overview

The data packets from each utility's endpoints are received by a custom T2 software service called the VN Server. This software application runs as a service in the Microsoft Azure cloud fabric and corresponds to the unique preset URL address. The VN Server processes and validates all data packets, updates the account data and deposits the interval data into the long-term data storage as shown in the following diagram:



The packets contain a header containing the ID, module information and the instantaneous reading and also 1 to 5 minute interval data which provides the resolution for applications such as demand billing, district metering, leak studies and more.

The VN Server also maintains a command queue. The command queue is a list of requests and instructions for specific endpoints. Following receipt of data packets, the VN Server responds to each endpoint with a positive acknowledgement of the data packet, or a command request for those endpoints with queued items. Commands can be requests for additional data (to fill data voids), reconfiguration, and operational firmware uploads.



T2 VIRTUAL NETWORK

Technical Overview

Data Storage

T2's meter data management (MDM) solution is fulfilled with the VN Server and the secure cloud storage. In this system, rather than dedicated servers at the utility site, the VN system utilizes cloud computing for a completely secure, redundant hosted system. T2 utilizes the Microsoft™ Azure cloud computing services which run on ultra-secure Microsoft™ data centers.

The data files are located in the Microsoft Azure storage which is multi-redundant, secure and highly accessible. Data sets in the Azure cloud are replicated within the same physical data center, plus are geo-replicated in a separate data center for extreme hardware fault tolerance. The VN Server also uses recommended "best-practices" for identity management, access authentication, and data/key isolation. The cloud tables are structured into account tables and long-term data storage tables. All account data is encrypted and all access is via SSL protected links.

The account tables are structured to hold record information on each utility account. This includes all account information as downloaded from the utility billing/customer service system (i.e. account number, address, measurement units, etc.). The account table also includes the account status which is the most recent billing read and any consumption flags. This table provides quick information access for the VN Central Utility Software.

The long-term data storage is structured within simple Azure cloud tables. The long-term storage is simply appended daily interval data. The purpose of the long-term data storage is for building consumption histories for customer service, engineering, analysis and maintenance purposes. The long-term data is available to the utility software and optionally to end-users.

T2 also has a software utility to populate past billing data archives into the data storage for comparative analysis purposes. This allows the utility to immediately make use of the software functionality.

Utility MDMS Applications

The VN Central software is the billing system interface tool for the utility personnel plus provides other critical functions. The VN Central software is a stand-alone package which accesses the account data from the cloud storage via a secure SSL link.

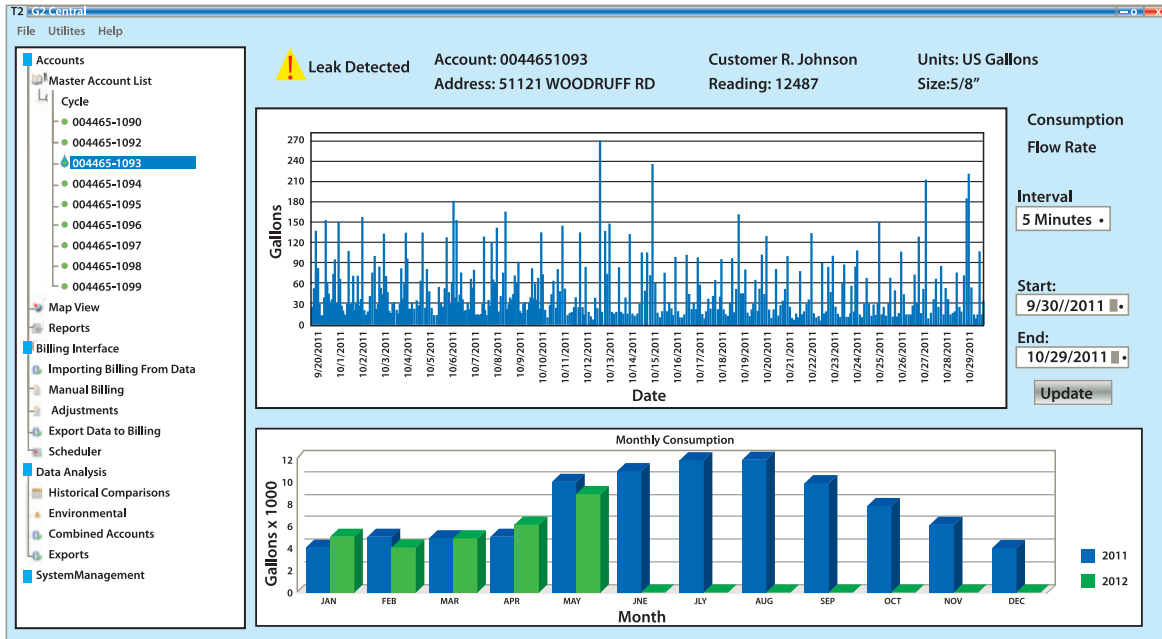
The VN Central software provides the following functions:

- **Monthly Billing Data Interface.** The software can manually or automatically query the account tables for time-coordinated billing files to be uploaded to the billing system. T2 has experience with literally hundreds of independent billing systems. T2 adapts an interface file format within the VN Central software which then seamlessly exchanges data with the utility's system.
- **Account Synchronization.** The VN Server requires an up-to-date reference list for all endpoints installed in the utility's system. The VN Central software is used to update the utility's account list.
- **Data Reporting:** The software can be used to generate a wide range of reports such as monthly consumption, high/low consumption, maintenance, probable leaks, high usage, conservation violations, zero-usage, backflow and many others.
- **System Status:** The software can be used to view system reading performance status and statistics at any time.
- **Individual Account Review.** The VN software can be used to review current account status, including account information, current monthly consumption, current consumption flags and notes.
- **Historical Account Review:** The software can be used to review historical account consumption data. This data is presented in graphical format in yearly, month, daily or hourly format. The user can also see statistics and approximate flowrate data for high resolution accounts.

Note: While the VN Central software can be utilized for the customer service functions, the web-based applications from T2 provide a much faster and efficient customer service tool.

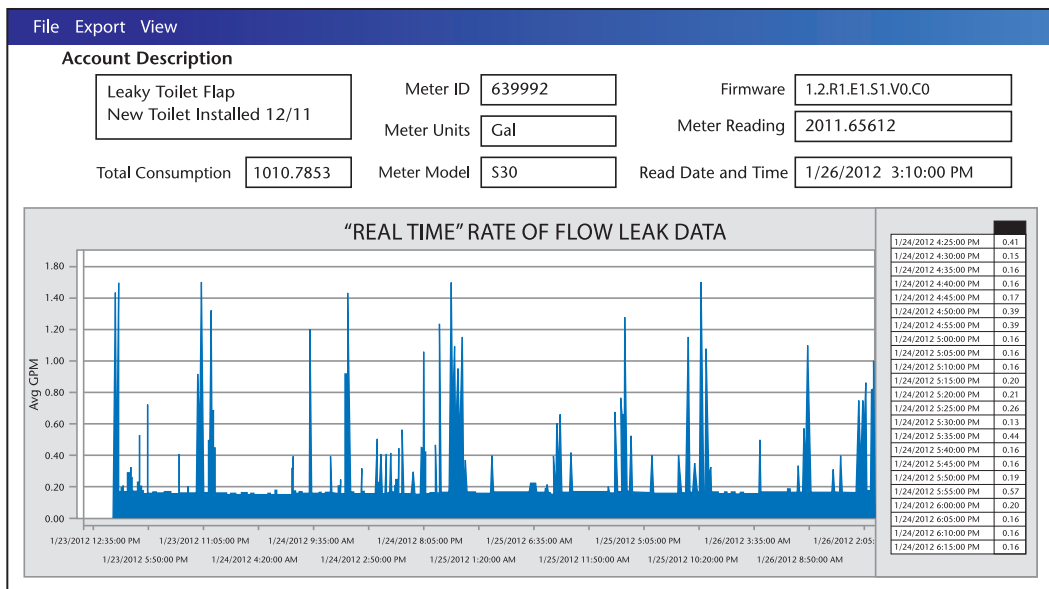


T2 VIRTUAL NETWORK Technical Overview



End-Consumer Data Access Software

T2 can provide web-based data access for a utility's end-consumers. This data access is provided via a secure link through the utility's website. Support for iOS (iPhones/iPads) and Android devices is planned for the near future.





T2 VIRTUAL NETWORK Technical Overview

These applications will access the water utility's homepage to access an account login page. With the correct login information, the end-user will be able to perform the following:

- Setup email notifications for consumption events (high usage, leaks, etc.)
- Access current account information
- Access historical account information. This information will be presented in graphical format and easily re-formatted to show yearly, monthly, daily and even hourly consumption patterns.

