

**TURBINE  
DIAGNOSTIC  
SERVICES INC.**

**"The Turbine Doctor"®**

**Publication: TDS-801**



# TurboNet CRL (Cyber Remote Link)

**Offers Remote Diagnostics & Troubleshooting**

## Features

- ☐ Remote Diagnostics and Troubleshooting of Stationary, Land-Based:
  - Heavy Duty Combustion Turbine-Generators
  - Medium Steam Turbine-Generators
  - Large Steam Turbine-Generators
  - Reciprocating Turbine-Generators
  - Diesel Turbine-Generators
- ☐ Helps Operators and Onsite Technicians Improve:
  - Availability of Equipment
  - Operating Reliability
  - Sustained Performance
  - Technical Resolutions
  - Cost of Service
  - Critical response Time

## Remote Capability To:

- ☐ Conduct Overall System Diagnostics.
- ☐ Troubleshoot Anomalies and Faults Using Available Data, Such as:
  - Alarm Page
  - Historian
- ☐ Enhance and Modify Customer Available System Graphics .
- ☐ Assist Customer Access in their Desire to Modify Programming Needs on a Real Time Basis.
- ☐ Assist Customer Electrical and Instrumentation Technicians to Identify Suspect Field Devices.

## **Built-In Features**

**Come talk to us about these exciting Features :**

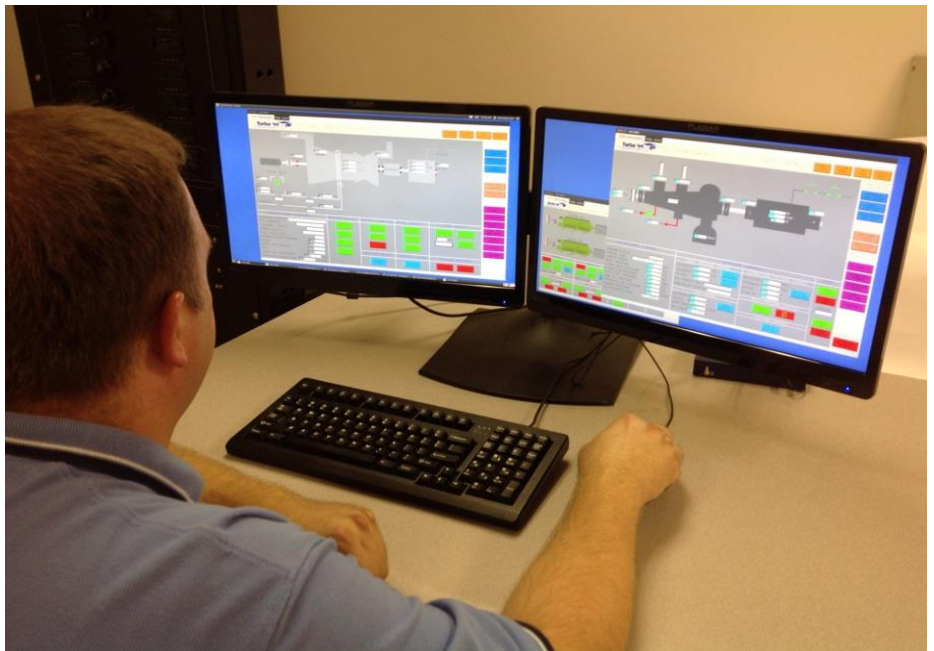
- ☐ Remote 24/7 Monitoring and Troubleshooting
- ☐ Proactive Customer Notification of Faults and Anomalies

## General Applications

**The TurboNet DASH 2®** is a robust, low-cost Digital Control System (DCS) that has been designed by Turbine Diagnostic Services, Inc. (TDS) to specifically control gas and steam turbine generators of all sizes and configurations. TurboNet is expandable to control and monitor all turbine generator functions, and if desired, the Balance of Plant (BOP) controls, as well. While the basic TurboNet System will control the turbine generator and associated subsystems for status monitoring and alarm functions, the system is expandable with options such as: a sequence of events recorder, a historian, vibration monitoring, generator auto-sync and remote monitoring and troubleshooting. This publication will briefly discuss TurboNet CRL (Cyber Remote Link) which provides the remote monitoring and troubleshooting option.

## Features – Available at Initial Install Date or as Retrofit

The TurboNet CRL option can be installed initially or, added at a later time after the Clients' **TurboNet DASH 2®** installation. The TurboNet System is truly a custom configurable DCS that can be customized to provide any range of options and desired I/O complexity required by the Client.



## **TDS Home Office – Network Terminal TurboNet CRL Administration**

At the TDS home office, the TurboNet CRL administration network is isolated from the primary office network. This is accomplished by having a separate physical network for all TurboNet computers including utilization of a dedicated firewall and different IP address. Additionally, the TurboNet CRL network is secured using the same Linux security measures for operating system, user, and communications as the client TurboNet installation.

## **Remote Diagnostics & Troubleshooting**

The TurboNet *DASH 2*® is built on a Linux Ubuntu platform. This allows the full power of UNIX type systems to be used for remote monitoring & troubleshooting through the use of available X-Server software.

The Human Machine Interface / Engineering Work Station (HMI/EWS) computers can be incorporated into the customer's office LAN or kept as a standalone LAN. If access is granted to Turbine Diagnostics Services Inc. (TDS) on this LAN, TDS can perform remotely any computer based troubleshooting that can be performed locally, including access to the historian and the historical data. This means that issues can be resolved quickly and efficiently remotely. The local plant personnel can perform the repairs based on the data that is available remotely. The troubleshooting by TDS is performed in the background without interrupting the HMI operation, i.e. we do not "take over" the HMI as in PC Anywhere based solutions offered by others.

## **TurboNet CRL VPN Remote Connectivity (Available as Client selected option)**

Connectivity between a client site and the Turbine Diagnostic Services, Inc. (TDS) home office can be established securely over existing client site internet infrastructure. This is accomplished by placing an additional firewall behind the client firewall to not only provide an additional layer of network security to the TurboNet network, but to separate the TurboNet network from the client network. The logical connection between the TDS home office and the client site will use secure, encrypted Virtual Private Networking (VPN). The VPN configuration will make use of 256-bit encryption. The additional firewall placed at the client site will be VPN compatible with the firewall at the TDS home office to ensure maximum reliability and security of the connection.

At the client site, the existing firewall will be configured to allow all traffic coming from the TDS home office IP address to be forwarded to the TurboNet firewall. The TurboNet firewall will be configured to only allow inbound connections to specific ports (VPN and SSH) from the TDS home office IP address and will require authentication of those connections. All outbound traffic from the TurboNet network will be blocked by the TurboNet firewall. For additional security, outbound connections from the TurboNet network/firewall should be blocked by the existing client firewall. By only allowing inbound connections from the TDS home office IP address, the TurboNet network is isolated from the client site network as well as the internet in general. This helps to ensure that the TurboNet network remains secure.

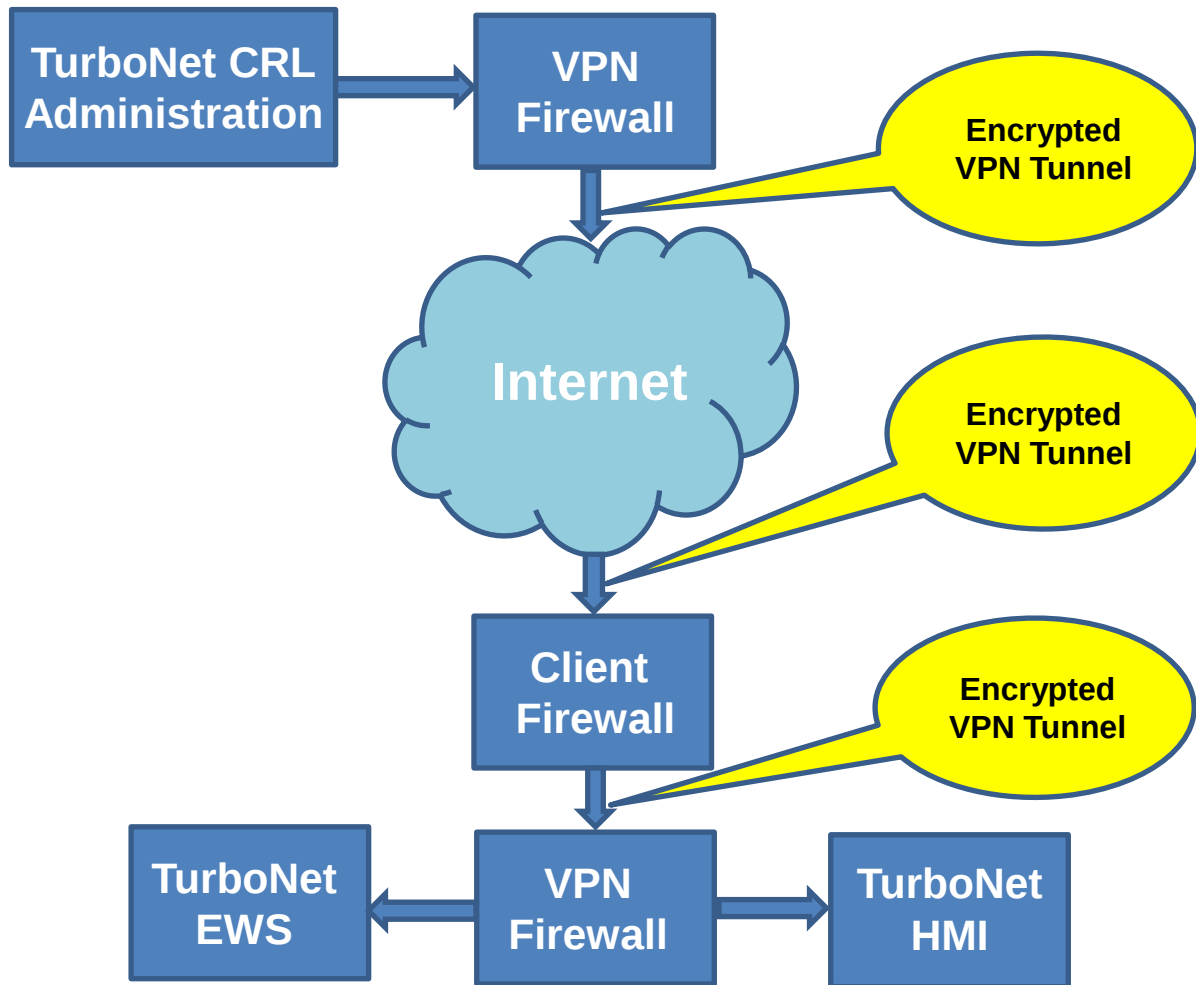
The TurboNet *DASH 2*® relies on standard Linux security measures to restrict network access to the Human Machine Interface (HMI), Engineering Workstation (EWS), and Historian systems. Intercommunication between systems is conducted over SSH. The non-secure protocols such as FTP, Telnet, and RSH are disabled. Additionally, user level security is implemented at the Operating System level to control access to applications and files on the HMI, EWS, and Historian systems. The user 'root' is login disabled and only the TDS Installation User, TDS Admin User, and TurboNet Maintenance User accounts are allowed to gain root-level permissions to perform tasks and modify files.

## **Continued Connectivity for TurboNet CRL Monitoring and Diagnostics**

Initially, Clients provide a prepaid standing purchase order for the Turbine Diagnostic Services Inc.'s TurboNet CRL access troubleshooting time. The initial troubleshooting time for this access is established with an agreed to minimum block of time by the Client through a purchase order to Turbine Diagnostic Services Inc. for engineering services. Turbine Diagnostic Services, Inc. will work from this established purchase order and the Client's account will be set-up to refresh the initial block of troubleshooting time with additional blocks of pre-determined purchased time. This allows remote troubleshooting services requested by plant operators to be performed with minimal delays and overall could save the Client critical down time.

## Remote Connectivity Basics

Connectivity for the TurboNet CRL Administration and TurboNet network are secured using the same Linux security measures for the operating system, user, and communications as the client TurboNet installation. A basic high level diagram is shown below. A more detailed diagram with identifying components can be provided upon request.



**High Level Diagram Indicating  
Communications Overview and Remote Connectivity**

**Turbine Diagnostic Services, Inc. (TDS)** is a full service turbine generator field service organization based in Odessa, Florida. **TDS** specializes in conducting steam & gas turbine generator planned & emergency maintenance controls troubleshooting, and vibration analysis & balancing services.

**TDS** has developed the **TurboNet DASH 2®** Control System from the ground up and each unit is custom configured to meet your specific needs. Contact Turbine Diagnostic Services, Inc. for a demo of our **TurboNet DASH 2®** system at our headquarters in Odessa, Florida. Contact us at: (727) 375-8700, extension 1228 or [sales@turbinedoctor.com](mailto:sales@turbinedoctor.com) to Schedule a Visit, Review Installation Options, Discuss Design Features in Detail or to Request a **TurboNet DASH 2®** Product Specification.

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