



Improving Network Performance with Geographic Network Mapping

interMapper

Network Monitoring Software
by Dartware

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Network managers are challenged to achieve reliable, peak network performance with infrastructures that are constantly changing and growing. Network teams that have easy access to real-time data about their networks including device and connection status, performance, and location are able to successfully meet service level requirements.

Many network teams rely on network diagrams that document devices (servers, routers, hubs, switches, and wireless equipment including radios and antennas) and indicate connections between them. While diagrams are useful for point-in-time views of network configuration, they do not provide data that is meaningful for troubleshooting, problem diagnosis, or problem resolution.

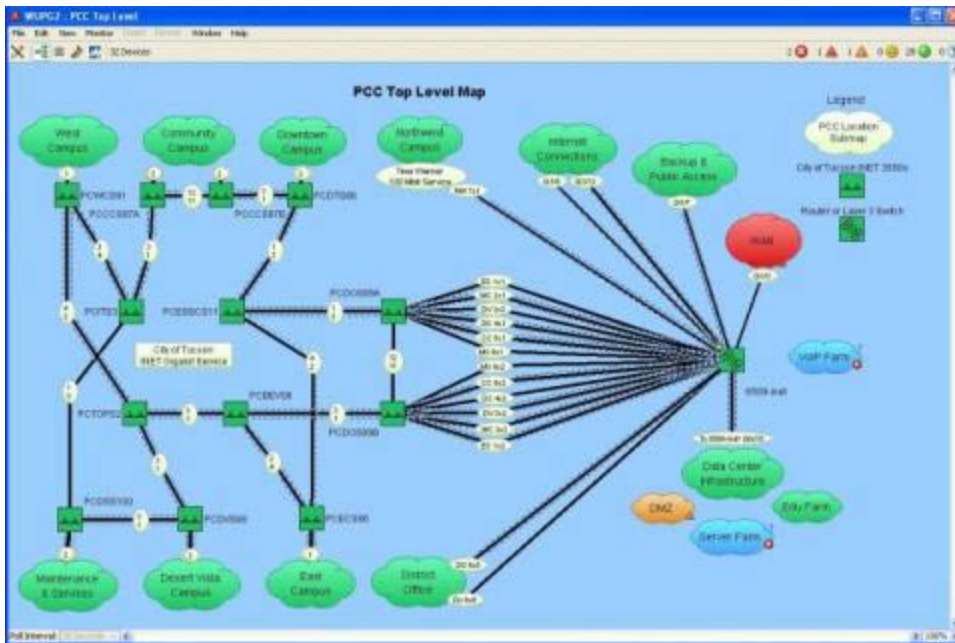
Network managers and their teams are finding true efficiencies – time and dollar savings – in network monitoring programs that provide graphic views of live network performance. Geographic network maps show device and connection location and provide visual and other forms of alerts to potential problems and outages. This real-time view of network performance and problem location gives network teams the data they need for quick troubleshooting and maintenance.

Network Diagrams

Network diagrams are incredibly useful for reminding network teams how devices and connections are organized. Unlike spreadsheets or report layouts, diagrams offer a visual representation of a network, pointing out interconnections and, to the extent the diagram is backed by a network monitoring system, showing the status of network elements.

Typically, status and performance data is available by clicking or rolling over an item on a diagram. This makes it extremely easy and fast to see and communicate where problems originate and how they impact overall network service.

The diagram below shows the layer 3 of the Pima County Community College network. It's somewhat easy to see where they reside (City of Tucson, for example) and what parts of the overall network they connect (green cloud labels).



Pima County Community College uses this network diagram to keep track of a highly distributed network that serves 18 locations and tens of thousands of students, professors, and administrators in the Tucson, Arizona area.

But, where, exactly, are those routers located? What street, what building, what room?

Geographic Network Maps

Network maps provide a clear picture of what is happening on the network and direct technicians to specific devices and connections that need attention.



O2 Connect's geographic network map displays subscribers in a residential area allowing technicians to note and fix performance issues before users are effected. Green color indicates that all is well. Yellow and orange would indicate poor or deteriorating performance. Red indicates an outage.

O2 Connect, a wireless internet service provider, uses maps to show subscriber units as well as the access points, switches, and routers in a particular community. Should an access point begin to fail, for example, it would be very easy to see which subscriber

units are affected. Technicians can be quickly dispatched to a problem device's exact location to make a fix before subscribers experience interruption in service. If an access point has failed, O2 Connect can communicate with subscribers in order to reduce technical support calls and customer dissatisfaction.

The amount of detail and pinpoint accuracy provided on a network map depends on the business and how technicians are distributed across the business coverage area.

Surf and Sip provides high-speed wireless Internet access in cafes, hotels, restaurants and other high traffic public establishments. Operating in four countries, Surf and Sip advertises speeds that are 20 to 50 faster than normal dial-up. They have a promise to keep.

This map of hotspots throughout the United Kingdom allows Surf and Sip network managers to keep a close eye on all their customer locations. This map shows that attention is needed in Cardiff, Portsmouth, Leicester, Chester and Reading. By clicking on those locations, network managers retrieve information needed by technicians who will fix performance problems or outages from a central location or, if needed, with a visit.

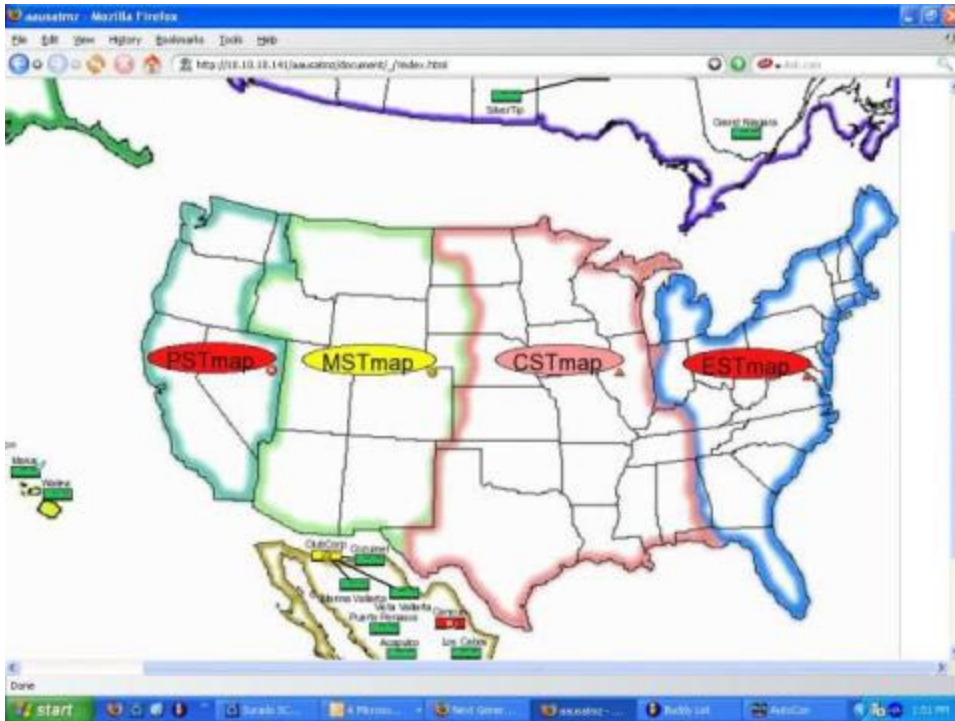


Wireless access locations provided and managed by Surf and Sip are indicated on this map of the UK. Points coded red are currently out of service.

Sub-Maps

Depending on network size and IT department organization, the utility of network maps can be increased with sub-maps. Sub-maps show more detail for a particular region, and allow network teams to drill down to particular areas of the network: towns, campus zones, buildings, or even network closets.

Integrated Business Solutions (IBS), a service provider that offers on-line reservation systems and network consulting to golf courses across the US and in Canada and Mexico, made this top level network map to show the entire market area and main network operation locations.



IBS uses this top-level map to provide a comprehensive view of their market and network coverage. It also offers quick access to sub-maps that indicate customer locations in each region.

IBS technicians drill down from the top-level map to see detailed information on network health and potential problems. Colored icons indicate which regions are having trouble. Here it appears that network devices and connections at Eagle Hills, Eagle Point, Eagle Rec, and River Ridge golf courses are all in need of attention.



This sub-map shows the IBS CSTmap. Technicians assigned to that region can see network performance is an issue for several locations coded yellow. Clicking on the coded locations opens status reports and performance trend views that aid diagnosis and fix prescription. IBS can dispatch service or call the customer to provide over-the-phone assistance.

24 x 7 Visibility

Network monitoring is much more effective when information – including maps - is available around the clock. Let's say that a network manager gets this SMS message at 5:00 am:

08/30 05:00:00 switch52.example.com 192.168.1.76 DOWN

He can see that a network device is down, and he has its IP address. But where is it located? Access to a map that shows the device's whereabouts will save an unnecessary drive or research time enabling him to fix the problem before people arrive for work.

Network maps should be accessible from any remote location to any staff member that has permission to view network device and traffic data. When maps provide street level detail, management and technical staff in headquarter offices are able to asses the impact of an outage or poor performance and dispatch assistance or inform staff and clients at those locations.

Locating Devices on a Map

Creating network maps require that the network manager know information about device locations, usually geographic coordinates, and then placing them on a map.

Most network monitoring or management solutions include autodiscovery of network elements – and even automatic network diagrams. Network managers in smaller organizations typically know where devices are located down to the particular network closet. Other times that information is tracked on a spreadsheet. Larger organizations have that same information but it might be kept office by office, or location by location. Centralization of location information is the first step in creating a complete network map.

Once network devices can be associated with a location, they can be mapped. The easiest way to create a geographic network map is to create a diagram and then place it on a map background. The background might be a scanned image – like a campus map – or a publicly available image. The major web map sites are good sources of images for map backgrounds. Once the devices are on a map they can be accurately arranged.

Precision is added when devices are geo-coded – linked by latitude and longitude data to their exact physical location. Google Maps and Yahoo's Geocoding APIs are both useful for determining coordinates for addresses in North America. There are other conversion utilities available for use with tabular data (spreadsheets that include addresses and zip codes).

InterMapper™ Network Monitoring Software

InterMapper, network monitoring software from Dartware, provides live, at a glance, geographic views of network health and performance. Underlying data is accessed by clicking on devices and connections making it extremely easy to inform and dispatch technicians.

Here is a typical map-driven network maintenance scenario for an InterMapper user.

1. A top-level network map and sub-maps are constantly visible in the IT offices/network operating center.
2. A sound alert indicates that performance has fallen below a set threshold.
3. Network technicians note a switch located in closet A in the Las Vegas office is coded yellow. A port on the switch isn't down but is giving lots of errors. Performance is deteriorating, and users will eventually notice degraded service.
4. Las Vegas technicians are notified of the problem and told to check the port on the switch in network closet A.
5. The technician fixes the problem, perhaps by selecting a different port, and allowing the switch to continue in service.

Dartware, LLC develops the InterMapper® family of network monitoring software. InterMapper earns quick return on investment by proactively alerting administrators to potential slow-downs, crashes, other business interruptions. Its real-time, color-coded maps and other data displays provide users with an instant view of their network and device status. Dartware's software is installed in financial services, healthcare, retail, education, government and non-profit, WISP, and ISP organizations around the world.