



The New Standard  
for Analyzing and Managing  
Threat Networks

## Sentinel TMS Version 3.0 New Features Overview

FMS Advanced Systems Group Whitepaper  
May 2005



[www.fmsasg.com](http://www.fmsasg.com)

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## Introduction

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With the introduction of Sentinel TMS 2.0, the FMS Advanced Systems Group provided customers with advanced technology for threat network analysis and management. By incorporating analysis-based link charts, Social Network Analysis, and powerful visualization capabilities in one environment, version 2.0 represented the state of the art in analysis software for the U.S. intelligence community.

As users have implemented Sentinel TMS 2.0, FMS has gathered suggestions on how to make Sentinel TMS even more powerful. The upcoming 3.0 release represents the results of conversations with customers, and our own research and development efforts. Sentinel TMS 3.0 has more new features than any previous release, and covers the entire spectrum from enterprise-level security, to enhanced analysis and visualization.

In total, Sentinel TMS 3.0 represents over 100 enhancement and additions. This document outlines the key new features.

## New Features Overview

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With the 3.0 release, we have concentrated on the following areas:

- **Enterprise Security and Access Control:** Sentinel TMS 3.0 introduces the new access control system, which makes it easy to manage access to information through managed users and groups. Additionally, the 3.0 release integrates directly with Windows-based Active Directory user and group objects to offer enhanced security.
- **Visualization:** Sentinel TMS 2.0 introduced many new concepts that made it possible to visualize large networks and discern meaning and predict actions. Version 3.0 builds on this foundation with new automatic network layout routines, user-configurable visual styles, and a powerful new 3-D network navigator.
- **Analysis:** Version 3.0 extends our unique Threat Network Metrics modeling system to include temporal analysis, find all paths, and individual analysis of entity and relationship weights.
- **General Usability:** Sentinel 3.0 includes a variety of new and changed features to make it easier for users to be productive. For example, the new Start Page organizes all commonly used functions in one place, and also provides history lists of recent data access and recent entity search phrases.

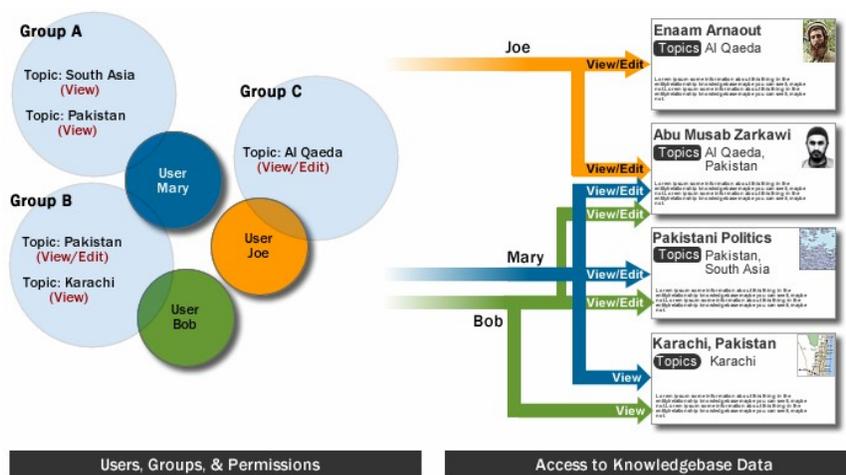
The following sections detail each of the new features.

## Enterprise Security and Access Control

One of the most requested features has been security and access controls. Sentinel TMS administrators need the ability for granular control over who can see what data. Additionally, the software would be easier to integrate into an existing mission if it could work within existing user authentication and identification systems.

With Sentinel TMS 3.0 we have addressed these areas by introducing a powerful new data retrieval and access system that allows complete control over data access. With version 3.0, administrators can now create Group and User objects that match the users and groups within their organization. Administrators can also create a set of topics that allow the organization of data in a way that maps directly to the mission.

From there, administrators can control which users and groups can see which topics. Additionally, the system supports permissions to control viewing, editing, and deleting of records. This granular, yet powerful design allows customers to employ Sentinel TMS to exactly match their mission and security needs.



Security has been enhanced by ensuring that Sentinel TMS integrates directly with existing user authentication mechanisms. By directly supporting Microsoft Active Directory, Sentinel TMS can now work within the most commonly-used authentication systems.

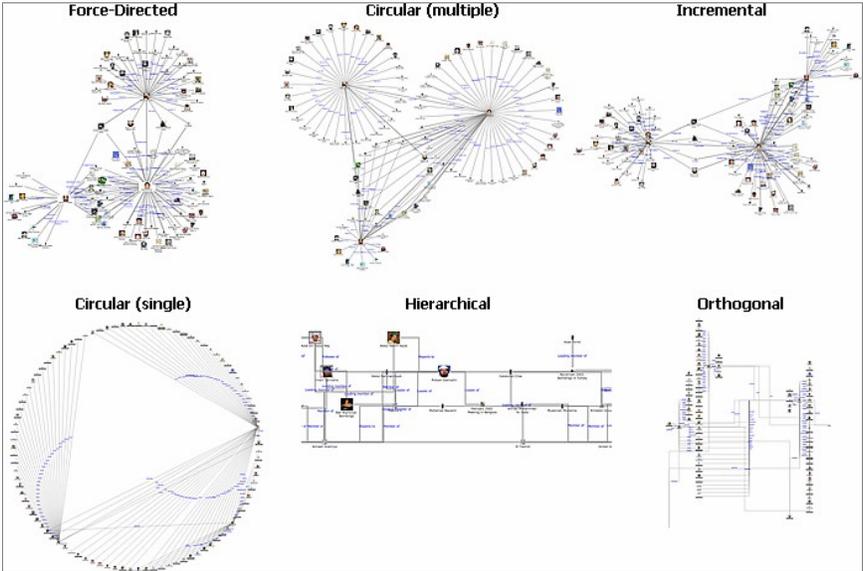
# Visualization Enhancements

With the Analyzer visual interface, Sentinel TMS 2.0 provided the next generation in threat network visualization. By quickly finding and organizing entity and relationship data into a graph view, and allowing user customization of that view, Sentinel TMS provided the most intuitive way to quickly visualize even the most complex data.

With version 3.0, we have added major new visualization features that make it easier to discover patterns and meaning in even the most dynamically complex networks.

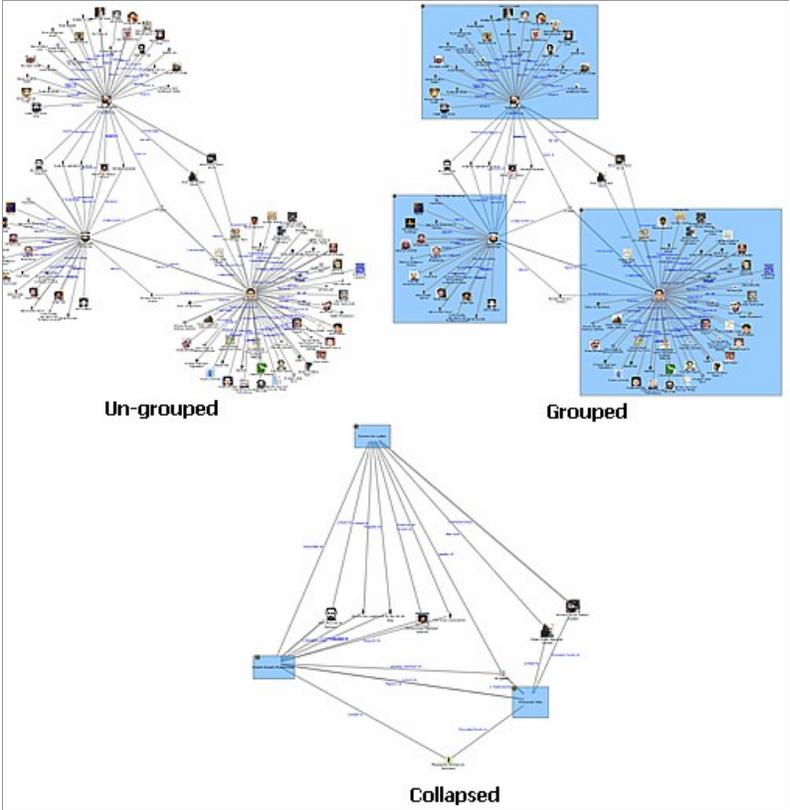
## New Layouts

Sentinel TMS 3.0 adds a variety of new automated layout functions that make it easy to quickly organize networks into several configurations. New layout functions include circular, orthogonal, hierarchical, incremental, and force-directed. Additionally, a variety of new options allow the user to customize various aspects of each layout type.



# Grouping

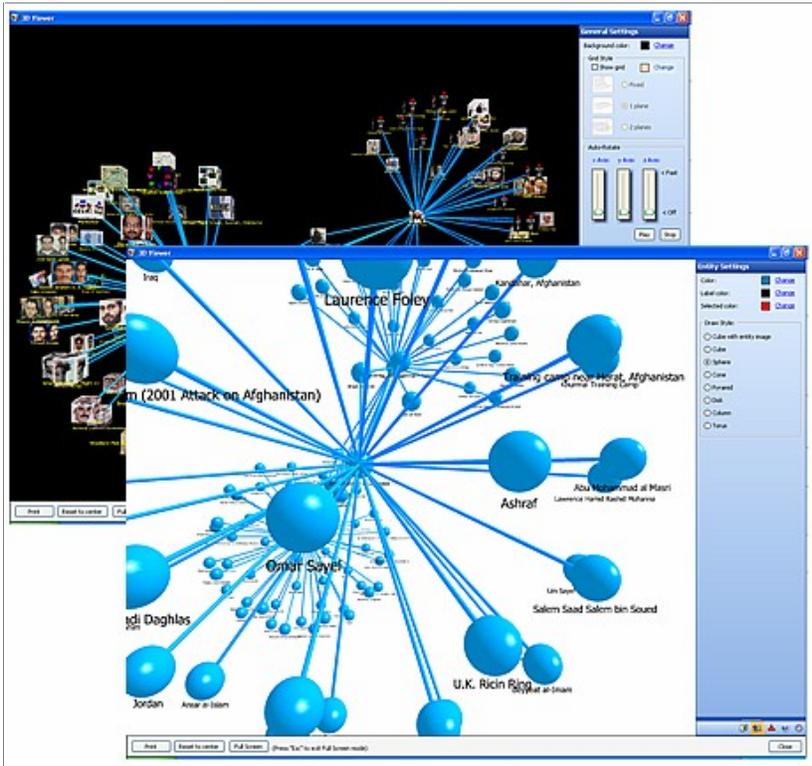
When working with large networks, it becomes clear that organizational tools need to be employed to better work with groups and clusters. To meet this need, Sentinel TMS 3.0 introduces the new Grouping feature. Users can select entities and group them by a variety of criteria. For example, the user could click on a person and group by 1 degree of separation. This would add that person and all the direct 1-degree links to a group.



Groups are defined by a visual box and can be moved and positioned in the network as a single entity. Groups can be expanded or collapsed, making it easy to organize a complex network into manageable units.

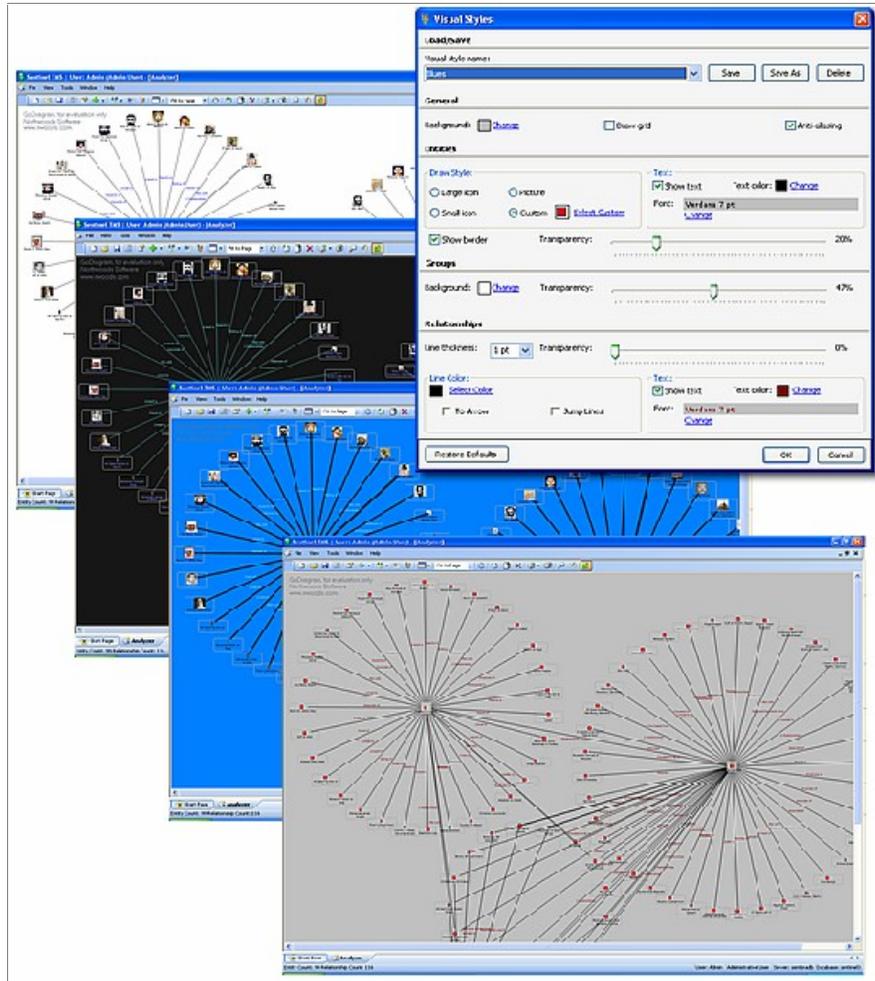
### 3D Graph Navigation

Often, complex networks are difficult to understand and explain using two-dimensional displays. Yet almost all network analysis software available today only represents data on a flat, two-dimensional surface. With Sentinel TMS 3.0 we have introduced our new 3D Graph Navigation Tool. With 3D rendering, users can now rotate, pan, and zoom in a three-dimensional space. Also supported is the ability to rotate an entire network around a user-defined point, with complete control over visual characteristics such as color and draw styles. With the 3D Navigation Tool, users can now explore and explain even the most complex networks.



## Visual Styles

Sentinel TMS 3.0 introduces user-configurable display properties for the graph view of networks. In addition to the default display style, users now have complete control over colors, icons, pictures, line widths, alpha-transparency, and a host of other parameters. Visual Styles can be named and saved, allowing users to maintain a set of favorite styles—each optimized for the task at hand. For example, the user could employ the standard configuration for viewing networks at 100% zoom level, or a high-contrast configuration for working with very large networks.

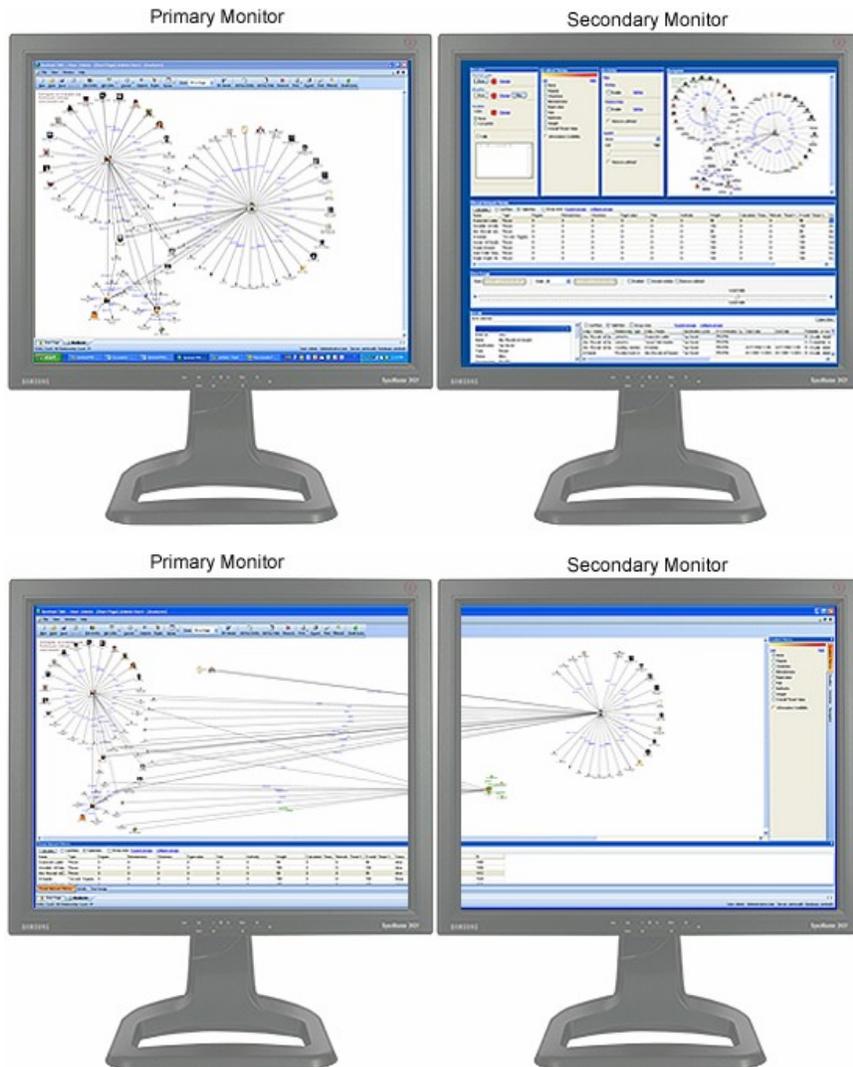


## Enhanced Printing Capabilities

Sentinel TMS 3.0 offers new features for printing network charts. Users can now scale the image to fit within one page, or specify the number pages to fit within. The print engine automatically prints registration marks to aid in the process of creating large-format network charts, and also supports user configurable margins, orientation, headers, and footers.

## Multi-Monitor Support

Major work was done in version 3.0 to provide the user with more screen “real-estate” while using the Analyzer to view and analyze networks. The key change is the introduction of a new mechanism for docking and moving toolbars. In version 3.0, users can move all toolbars to a second monitor to maximize the screen area available for viewing larger networks.

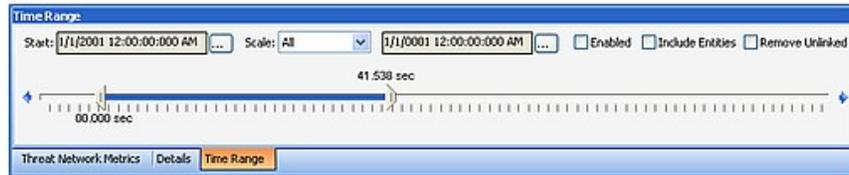


## Analysis Enhancements

### Temporal Analysis

Sentinel TMS 2.0 offered the ability to store temporal data with entities and relationships. This feature provided the ability to query data within time ranges. Version 3.0 extends this ability by offering dynamic temporal analysis, with precision down to the millisecond level.

Within the Analyzer interface, there is a new time-range control that allows users to specify time periods, and then see how the network has changed over time. With complete control over visual options, users can now see and understand the temporal nature of networks. Additionally, the temporal view is directly integrated with all other visualization options, including threat network metrics, filters, and grouping.



## Entity and Relationship Filters

The Analyzer interface makes it easy for users to quickly find and display entity information using a visual network metaphor. But as more information is displayed, networks become visually complex, making effective analysis more difficult. To provide clarity, Sentinel TMS 3.0 introduces a comprehensive set of new entity and relationship filters.

To define a filter, the user simply specifies criteria and then enables the filter. All entities and relationships that do not meet the criteria are hidden, dramatically improving the readability of the network display. A simple button click removes all filters, allowing the user to toggle between different data sets.

Entity and Relationship filters allow complete control over criteria—every entity and relationship field is available for filtering.

## Squelch

The concept of squelch is as old as the invention of the radio. Squelch allows you to filter out noise, making it easier to hear the original signal. As we have worked with visualization and analysis on large networks, we have discovered the applicability of this metaphor—the ability to filter “noisy” items out of a graph, leaving only high-value information.

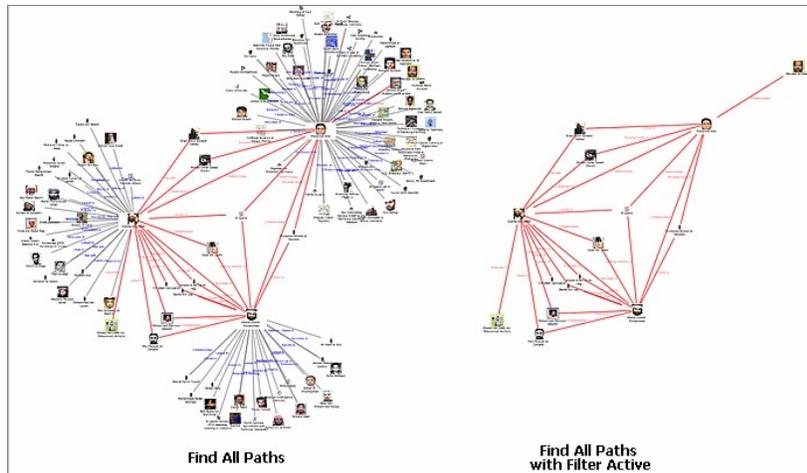
Sentinel TMS 3.0 implements this concept as the new Squelch control. The user can choose from a variety of criteria, including Social Network Analysis values, Information Credibility, etc. As the user moves the Squelch slider control, the network is updated to show only the information that is higher in that value.



Squelch makes it easy for users to dynamically hide or show data by a variety of criteria in real time, and represents the next major advancement in Sentinel TMS functionality.

## Find All Paths

With highly interconnected networks, finding paths between entities is one of the most common objectives. Sentinel TMS 2.0 offered the ability to quickly find the shortest path between any two entities. Version 3.0 extends this functionality with the new Find All Paths feature. Users can select any two entities in the network, and all paths between the two are instantly calculated and highlighted. Furthermore, the system supports the ability to filter out all non-linked entities with the push of a button, leaving only the two selected entities and their paths.



## Entity and Relationship Enhancements

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Various enhancements have been made to the Entity and Relationship Knowledgebase, including:

- Support for multiple topics, allowing easier categorization of data.
- Enhanced temporal storage now supports storing and querying temporal data down to the millisecond level.
- Improved user interface design to optimize read vs. edit modes when viewing entity and relationship records.
- Ability to store URI or URL hyperlinks as documents.
- Entity and Relationship selection forms are now even more intuitive.

## Other New Features

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Various other features have been added to improve usability, including:

- A new Start Page organizes all common tasks, and includes one-click hyperlinks to recently access data and recent entity search phrases.
- New Report Filters allow more granular control in choosing data for reports.
- Small mode for toolbars in the Analyzer tool provide for more screen "real-estate."
- User and Administrator Guides are available from within the program.
- Improved default search mode for Entities.
- Administrator-controlled permissions for viewing, editing, adding and deleting records.
- Usability improvements in the New Entity and New Relationship wizards.

- Streamlined options for configuring Analyzer layout tools.
- New Analyzer details tab showing relationships for the currently-selected entity.
- New Dataset Builder options to control what data is returned.

## **Availability**

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Currently, Sentinel TMS version 3.0 is now available.

## **Contact Information**

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For more information about our products and services, please visit the FMS Advanced Systems Group website at [www.fmsasg.com](http://www.fmsasg.com), or contact us directly.



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## **Conclusion**

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The FMS Advanced Systems Group is pleased to offer the next generation of analysis and visualization tools to our customers. Indeed, customer feedback has driven much of the version 3.0 design process. We look forward to delivering this new version, and have more concepts already in development for future releases.