



Nets White Paper

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Introduction to the Nets network inventory
and management system.
For Nets Revision 2.5

1.0 Introduction

This White Paper describes **Nets**, the network inventory and management system from Open System Consultants and Irvine & Associates.

This paper is intended to help Managers and Engineers understand:

- The main features and benefits of **Nets**.
- How **Nets** can assist Managers track network assets.
- How **Nets** can provide budget and provisioning information.
- How Engineers can use **Nets** to maintain up-to-date network data.
- How **Nets** can be extended to meet site-specific requirements.

Nets is a graphical source code product providing a flexible and extensible environment for maintaining essential network inventory, configuration and cost information in a platform and database independent manner.

Nets provides a physical model of the network, from which it is simple and straightforward to derive and display any number of textual, logical or graphical views.

Nets is designed by internetwork engineering professionals to address the common problems encountered in network design, management and operation.

For more information, consult the following URL:

<http://www.open.com.au/nets>

2.0 Overview

Nets is a platform independent and database independent application that enables Managers and Engineers to easily maintain accurate and up-to-date network data.

Nets is delivered with a standard set of database objects together with editing, viewing and reporting tools which provide the framework required to maintain a complete, detailed inventory of any computer network.

Nets is based on the following elements:

- Locations - Points of Presence (POPs), telco exchanges, co-location facilities, etc.
- Racks - equipment racks used to house devices
- Devices - servers, workstations, routers, switches, patch panels, etc.
- Slots - devices may have any number of slots
- Interfaces - those device elements that connect to links
- Cards - interfaces may be contained on cards, which can be inserted into slots
- Links - LAN, WAN or cable plant connections
- Protocols - typically TCP/IP, but any protocol is supported (IPX, Appletalk, etc.)
- Addresses - protocol addresses configured on interfaces
- Address Maps - graphical representations of IP address blocks and usage
- DNS Names - the DNS names that correspond to interface addresses
- Graphics - maps, drawings and schematic diagrams of the network

Nets is a source code product that includes the user interface definition and the standard database object schema in source form so it is easy to add or modify the system for site-specific requirements.

3.0 Nets Features and Benefits

Nets features include the following:

- Platform independent - runs on any version of UNIX or Windows
- Database independent - runs on most SQL databases, including MySQL, Oracle, MS-SQL, Sybase, PostgreSQL, Interbase, Informix, etc.
- Ability to track essential network data and information
- Ability to record purchase and asset information
- Complete user preferences and permissions
- **Nets** sessions and screen layouts can be saved and restored
- Powerful report writer facility to extract database information
- Plugin API and external hook support to extend functionality
- Licensing based on the number of concurrent **Nets** users
- Auto-discovery based on **nmap** scan output

Nets benefits include the following:

- **Nets** can be deployed on any combination of platforms, including Windows 95/98/2000, NT, any version of UNIX, Linux, FreeBSD, etc. This allows **Nets** to fit into any common corporate environment without the need to purchase new hardware.
- **Nets** supports most of the popular commercial and Open Source SQL databases available, allowing operation in virtually any organisation. This permits those organisations with databases to continue using their existing systems, and those organisations without an existing database are free to use Open Source or commercial databases as best suits their needs.
- Managers can get answers to questions such as “**what is the current state of the asset register?**”, “**where is this particular piece of equipment?**”, “**how much does the network cost to operate on a month to month basis?**”. This alleviates a constant source of frustration in any network environment and will appeal to both financial and technical staff.
- Network engineers can get answers to questions such as “**what devices are deployed at this POP?**”, “**how many interfaces are installed in this device?**”, “**which telecommunications links have been ordered for the new POP?**” “**what IP addresses from the CIDR blocks are in use?**”. Engineers will appreciate the ability to collect and maintain all of their network information in one single, well-organised system.
- Users access to the system is controlled by username and password, and all activity is logged to the audit trail. This allows the **Nets** administrator to define various levels of access to **Nets** objects, so that normal users can only view certain information, whilst privileged users can create, modify and delete other information. The audit trail maintains a complete log of all database activity.
- Users can open and position any number of **Nets** screens which can be saved and restored between sessions. This allows users who access **Nets** frequently to set up a standard window layout which will be displayed each time they log in, thus speeding access to relevant information.
- Organisations can purchase **Nets** with a license for only the number of concurrent users required. The total number of users defined in the system is unlimited. This permits an organisation to start with a limited license and add to it as more users require concurrent access to the system.
- Initial data entry into the **Nets** database can be automated by using the output from the **nmap** scanner. This allows basic network information to be gathered and loaded into the database quickly and easily.
- Licensed versions of **Nets** include 95% source code and an unlimited full-source version is available. Licenses can be upgraded at any time. **Nets** support contracts include all system upgrades for the duration of the contract.

4.0 The Problem with Networks

Any organisation with a computer network understands the following fundamental truths about computer networks:

- network growth is very rapid and uncontrolled (estimates of 100% growth or more per annum are common)
- keeping track of all network-related equipment is extremely problematic
- as a result, budgets and expenditures are difficult to estimate and control, and the network is difficult to manage and maintain technically
- as an organisation and its network grow, the number of network information repositories and the number of paths of communication grow exponentially, inevitably causing unnecessary management problems

Network managers and staff will also recognise the problem of maintaining the dozens of lists that are necessary to operate a network. The lists include at least the following elements (plus many more):

- Hosts and host services
- Service configuration files
- Routers, switches and hubs
- Router software versions and configuration files
- Patch panels and patch connections
- IP addresses and subnet masks
- DNS names and address mapping
- Equipment locations and contact details
- Equipment racks and space utilisation

Technical managers also require lists of information such as:

- Suppliers
- Equipment ordered, delivered, commissioned and in service
- Spare parts and equipment
- Telecommunications links ordered, installed and in service
- Projected expenditures according to provisioning estimates
- Budget forecasts for equipment and telecommunications services

Financial and administrative managers and staff require information such as:

- Cost of equipment
- Dates of purchase and installation
- Serial numbers and asset register
- Ongoing telecommunications costs
- Depreciation and equipment decommissioning and disposal

Nets assists with all these aspects of computer network management, maintenance and operations.

5.0 The Nets Solution

Nets employs a relational SQL database to store important network and network-related information. The main database objects are Locations, Devices, Interfaces, Links and Graphical images.

Locations are defined with a wide variety of attributes, including: street addresses and contact details, together with geographical latitude and longitude, allowing Locations to be displayed directly on maps.

Device definitions include attributes such as: supplier, cost, date of purchase and installation, together with the Location at which they are installed.

Interfaces are associated with Devices and include attributes such as: type, address, link connections, cost, and date of purchase and installation.

Links are defined by attributes including: type and supplier, order date, installation date, installation cost and recurring cost.

Graphics support allows the importation of maps, drawings and digital photographs, which can be arranged in any order and hierarchy with navigation through menu items or pre-defined click-through areas. Images can be edited and icons can be added and moved interactively.

Because **Nets** is a database application with a graphical user interface, entering and maintaining information is quick and efficient. **Nets** provides full support for database import and export, and a powerful report writer is also included.

Nets users are configured by the **Nets** administrator with usernames and passwords, and users access to database information is controlled by fine-grained permissions. All database activity is logged and a complete audit trail is maintained.

The **Nets** database schema and user interface definition are provided in source form so that modifications and additions for local use are simple to implement.

The standard **Nets** database schema includes storage for information regarding typical network data including: locations, devices, interfaces, links, racks, patch panels, cabling, drawings, maps, purchase dates and costs, serial numbers, asset numbers, etc., etc. Network specific data such as IP addresses, netmasks, CIDR blocks, DNS names, router software versions and upgrades can also be stored.

5.1 How Nets Can Assist Managers Track Network Assets

The standard **Nets** database includes location information for all equipment, together with additional information such as: order date, purchase price, installation date, service status, depreciation, upgrades, etc. The **Nets** report writer can therefore be easily used to generate equipment lists by location, by device type, by service status, etc. All equipment serial numbers are also recorded to provide a complete asset register for administrative purposes.

5.2 How Nets Can Provide Budget and Provisioning Information

As the **Nets** database contains purchase price, date of purchase, date of installation and depreciation information, reports can be prepared to show expenditures over time and projections can be made in order to assist with budget preparations. Actual expenditure against budget can also be compared for management purposes.

5.3 How Engineers Can Use Nets to Maintain Up-to-date Network Data

The **Nets** database assists Network Managers with day-to-day management as well as network planning. The database can be used to store IP address information for all interfaces in the network, together with the corresponding DNS names, allowing effective management of IP address space and DNS zone files. All devices, interfaces and links will be stored in the database, together with the relationships and connections between them. Thus it is a simple matter to generate reports showing the list of equipment at each location, the list of all links terminating at each location, the interfaces connected to all links, the list of all patch panels and all patch connections. Additional screens and reports can readily be added for site-specific requirements.

5.4 How Nets Can Be Extended to Meet Site-specific Requirements

Nets is written in Perl and uses the Tk graphical toolkit to provide a graphical user interface. The user interface screens are entirely data-driven and the source code is provided so that site-specific requirements can be easily met. **Nets** uses the Perl DBI/DBD modules to provide database independent SQL support, and the source code for the SQL schema is provided.

Nets is written in a modular object-oriented fashion with Plugin API and generalised external hook support, making it straightforward to add additional local features. The Plugin API allows custom modules to be added to **Nets**, whilst hooks are provided at specified moments during processing, such as before and/or after a database creation, modification or deletion.

Graphical images in GIF, XBM and XPM formats are supported and other image formats can be added by providing a suitable Tk module. Images can be hierarchical and drill-down is supported so that multi-layer maps, drawings and schematics can be displayed. **Nets** includes a standard set of icons for use in images and users can freely add their own icons to their drawings. Drawings can be prepared in any external drawing program and maps can be scanned, or digital photographs can be used.

6.0 Conclusion

Nets provides an open, flexible and extensible framework for maintaining the vast range of data and information required to operate any computer network. The majority of the **Nets** source code is included with the limited-license versions and the full source code is available in the unlimited version.

Conclusion

Nets users will enjoy on-going product development with upgrades included with support contracts. User group contributions to the product are encouraged and will be added to the core distribution.