



Critical IT Infrastructure Management

This paper discusses how large organizations can manage and protect their IT network infrastructure via consolidation of data. A centralized approach is the only solution that can provide a thorough, accurate snapshot of the current complete network of cable, assets and connectivity, thereby facilitating business planning and operations on both strategic and tactical levels.





The Industry Today – Situation Analysis

Today, most enterprise and government organizations manage technology infrastructure and associated assets using a variety of applications, drawings, databases, and even spreadsheets. Although it is a critical component for success, many organizations do not manage their technology infrastructure as a strategic asset on an enterprise level. Instead they rely on scattered stovepipe tactical resources in an attempt to build, manage and maintain this information. As a result, data must be entered into many different repositories in varying formats and be maintained by multiple organizations for installations, moves, relocations, and build-outs. Examples of the repositories which are subject to these changes are:

- » Vector drawn diagrams for equipment rack elevation locations & WAN environments (usually maintained in the Data Center Operations groups)
- » Spreadsheets or databases to maintain patch changes for security, server and network equipment (usually maintained by the Network Operations Center)
- » CAD drawings to represent floorplans, room layouts and WAN diagrams (usually maintained by Facilities)
- » Spreadsheets or databases to maintain inside and outside plant pathways and cabling (usually maintained by Telephone Operations or Facilities)
- » Spreadsheets or databases to maintain changes to local and wide area circuit assignments (usually maintained by the Network Operations Center)
- » Information Assurance Repositories, both cyber and physical (usually maintained by the Information Assurance group)

It is very difficult to maintain data accuracy when it is distributed in multiple forms across a variety of stovepipe applications.

The Need to Manage Operational Risk

Every enterprise and government organization needs to manage technology infrastructure and assets through proper documentation and controlled tracking, ensuring a consistent level of operation under any circumstance. How well an organization deploys and maintains assets and services is measured by the level of operational readiness within its technology infrastructure and by its ability to react to adversity.

Unfortunately, disruptions occur in every enterprise and often put mission-critical systems at risk. Disruptions can take many forms: human error; equipment failures; or deliberate attempts of those focused on an organization's destruction or failure, whether they be via cyber or physical attacks. In support of IT Security efforts, an organization needs to identify affected areas, regions, sites, or devices and quickly determine the overall impact

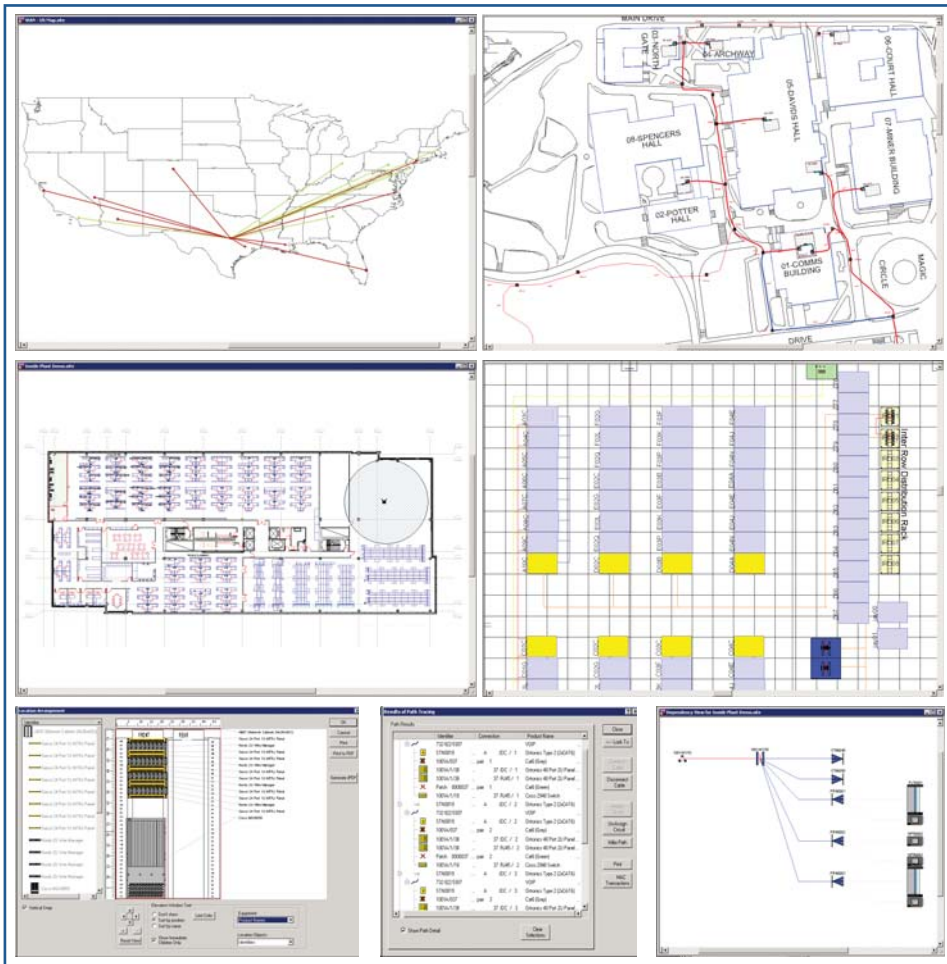
of various types of failures and address the following questions:

- How effective is the organization in a crisis management situation?
- How quickly can one identify points of failure?
- How quickly can cause and impact of an incident be identified?
- How quickly can affected critical services and equipment be physically located?
- How quickly can business, technology and work area recovery plans be executed?
- Is there sufficient network infrastructure diversity in the event of a fire, natural disaster or act of terrorism?

Introduction to Planet® IRM

Planet® IRM (Infrastructure Relationship Management) is a comprehensive solution enabling organizations to support strategic and tactical priorities while providing a visual, centralized and consolidated Configuration Management Database (CMDB) of both physical and cyber infrastructures and associated dependencies. Planet IRM's visual CMDB provides the essential foundation of an organization's Information Technology Infrastructure Library (ITIL) framework.

Today's enterprise and government organizations have strategic priorities that include:



1. Enhanced corporate governance, control, consolidation and oversight of Critical Infrastructure Information
2. Management of operational risk relating to systems, processes and external events
3. A focus on infrastructure technology as a critical asset; the need for tactical and strategic secure services for first responders; and improved processes for infrastructure stakeholders
4. Maintenance of Wide Area Networks, Metropolitan Area Networks, Campuses, clusters of Service Delivery Points, Buildings, Telecom Administration Points, and Data Centers
5. Comprehensive analytical tools and reports to assist in daily tactical and strategic operations and enterprise management
6. Integration with cyber security tools built to protect the network from a cyber perspective

Planet IRM has the ability to visualize national maps, campus maps, floorplans, and equipment elevations. It can perform circuit bandwidth and usage analysis; be used to facilitate space, user and data center management; perform path traces; and determine element dependencies.

The ability to centralize and consolidate information technology infrastructure and associated assets into a geo-referenced analytical database enables organizations to quickly identify management issues and significantly reduce operational risks. Recovery plans can be created and executed quickly and efficiently. Once users have identified points of failure, they can perform impact and dependency analysis. This functionality provides organizations with the analytical tools required to instantly identify critical assets, services, or affected areas within the impacted or dependent infrastructure.



Planet IRM is a critical component of an organization's Enterprise Architecture, and a foundation for ITIL compliance. It is used to support scenario simulation in planning mode to identify points of failure. Good disaster recovery plans are dynamic and change along with the technology infrastructure, and maintaining an accurate real-time view of that infrastructure is critical to ensure that planned recovery scenarios can be translated into reality when an event occurs.

In such instances, Planet IRM's ability to be widely accessed throughout the enterprise or via the internet allows technology infrastructure for affected areas to be viewed and managed from any location. In many organizations, a large quantity of IT infrastructure information is maintained locally and cannot be accessed or utilized in a crisis. In contrast, Planet IRM can be used to quickly generate all appropriate reports to support business, technology and service recovery plans. These are provided in the form of iiPDF™ files, iiReports™, visualizations, or business graphics and can be distributed according to the guidelines in appropriate recovery plans. A permanent audit trail will automatically be created for all transactions generated during the crisis. This allows for the future review of the accuracy and effectiveness of the plans.

An integrated solution meeting the following needs is required to effectively manage and analyze today's complex globally-distributed infrastructures:

- Geo-referenced maps and analysis tools
- Inventory Management (sites, equipment, circuits)
- Drawing plans with site, building, floor, room, & cabinet layouts
- Physical and cyber connectivity design, reporting and analysis
- Change Management transaction accounting
- Enhanced security data access controls
- Integration with operational real-time management

platforms (e.g., HP OpenView, CA Unicenter®, IBM® Tivoli®, EMC Smarts)

- Integration with operational service support platforms (e.g., Remedy®, Clarify)
- Integration with discovery tools (e.g., IBM Tivoli Network Manager, EMC Smarts ADM, BDNA Insight)

Planet IRM's many migration and correlation tools allow disparate documentation sources to be consolidated into a single enterprise-wide CMDB repository. This integrated approach ensures data consistency, provides a single point of entry and reference, and establishes a centralized analytical and reporting database.

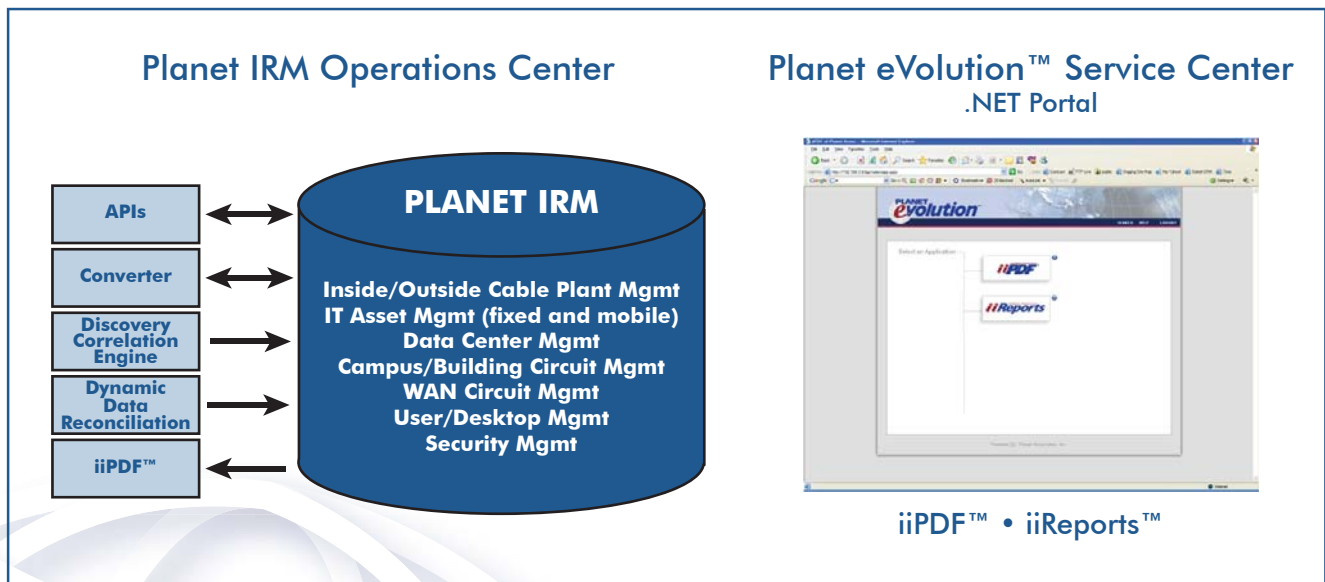
Data access is easily available to any authorized user on a local intranet or over the Internet via thin client, Remote Desktop or remote web client interfaces. By utilizing CMDB administrative roles and privileges, data access can be controlled centrally from a single interface.

Implementing Planet IRM facilitates:

- High data accuracy
- Reduction in operational costs due to reduced data collection time and fewer required resources
- Integration with operational systems
- Single point of reference for all IT infrastructure data and assets
- Asset management and control
- Immediate information analysis for first responders
- Availability of infrastructure data on an enterprise level for Total Situational Awareness
- Information Assurance from a physical perspective
- Comprehensive IT infrastructure analysis, design, planning, and deployment efforts

The Planet IRM Solution

To best serve the many business functions that can benefit from the vast array of information contained within Planet IRM, the complete Planet IRM solution consists of two major components: the Planet IRM Operations Center and the Planet eVolution™ Service Center.



The **Planet IRM Operations Center** is the core CMDB with its associated tools, which consolidates infrastructure data across multiple disciplines - facilities, security, IT, telecom, and operations - to provide total oversight of critical infrastructure information. It allows business leaders to gain insight and control over their entire organization, ensure business continuity, assist in disaster recovery efforts, serve as a foundation for critical infrastructure protection, and increase flexibility for change and asset management. Operations Center users are trained at multiple levels to perform administrative and implementation functions; and access is controlled by detailed roles and privileges.

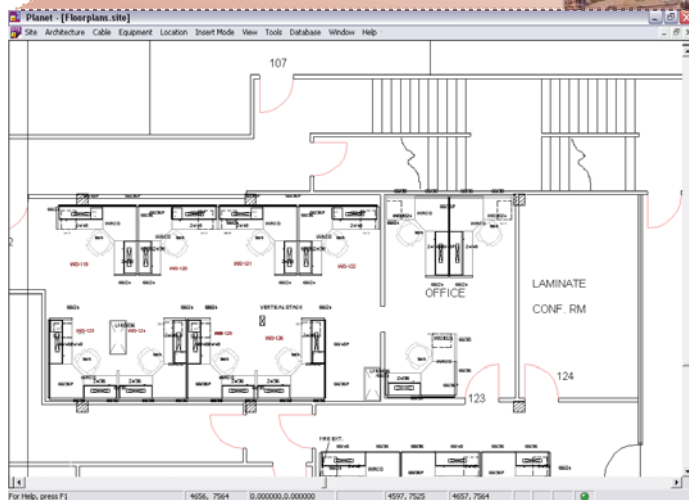
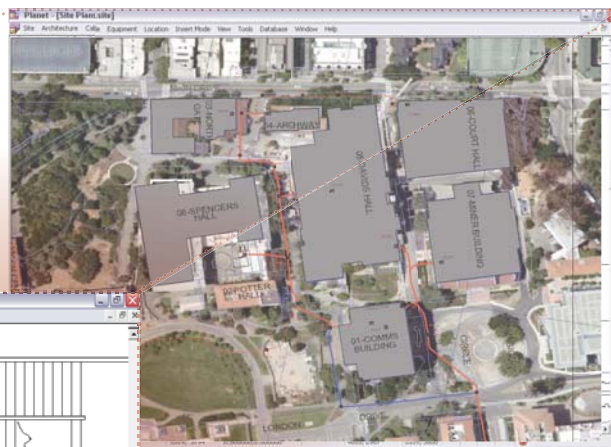
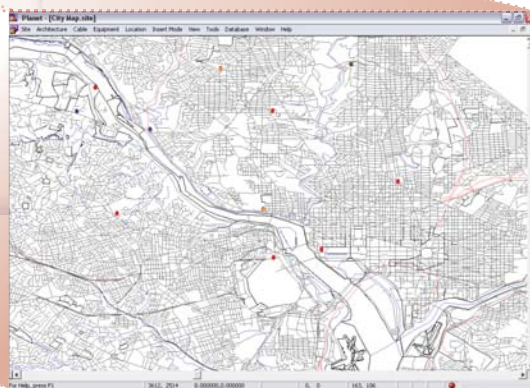
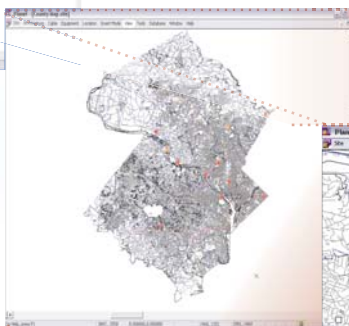
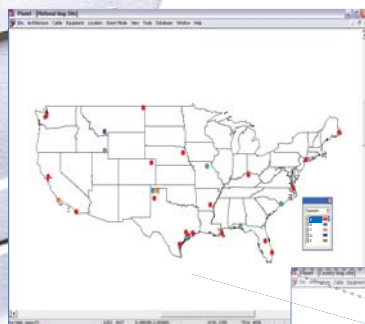
The **Planet eVolution Service Center** is an internet-accessable portal, which allows authorized remotely-located personnel to retrieve detailed infrastructure information (via iiPDF™ or iiReports™) from the Planet IRM repository. This enables managers, technicians, and emergency response units easy access to key infrastructure information at any time. Only minimal training is required, depending on the type of access granted.



Geo-Referenced Information

Planet IRM utilizes geo-referenced layered maps, street plans, site plans, floor plans, and infrastructure spaces. This inter-related information is the foundation of the design and analytical tools and allows an organization to quickly visualize their mission critical infrastructure using many different dimensions.

Enterprise infrastructure data can be drilled-down from the highest level and visualized within any map, drawing or cabinet. This ability allows organization managers and technicians to easily extract information necessary for planning, analysis, design, and management purposes. GeoTIFF, MrSID and ESRI SHP files can be included for photographic site representation.

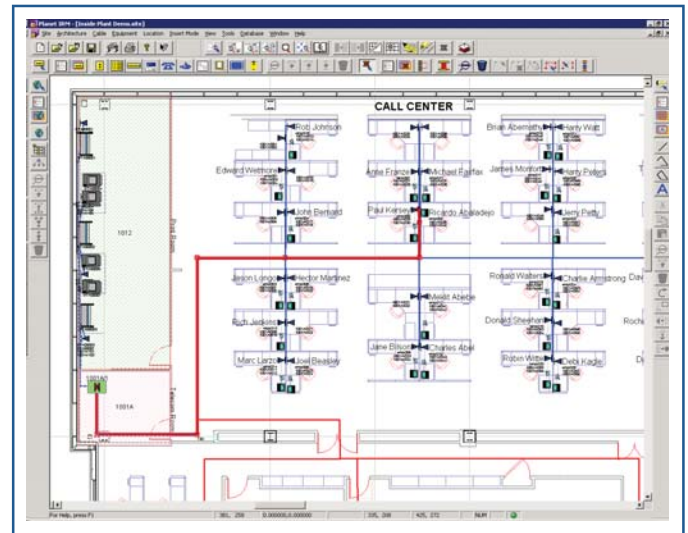


Physical Plant Management

Physical Plant Management offers unique capabilities for both inside and outside plant. It creates a comprehensive, geospatial or CAD-based map for all assets, systems, and interdependencies across the enterprise. Planet IRM increases asset visibility and control through an integrated visual interface providing hierarchical links to maintain the entire infrastructure. Cabling connectivity information for data, voice, environmental, security, video, and other elements are stored in both a visual and data representation format. Planet IRM's change management tools facilitate the processes required to maintain an accurate accounting of all this information.

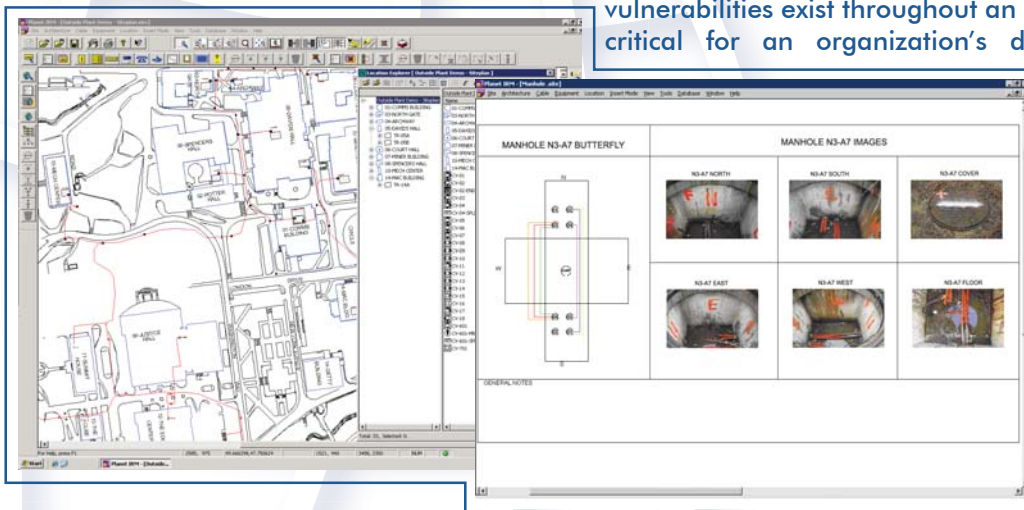
For **Inside Plant** applications, Planet IRM maintains all IT and telecommunications infrastructure data including cabling, equipment, circuits, and connectivity within each building, floor, and telecom closet in a relational database. It also provides users with the ability to separate layers, systems, and networks within the infrastructure allowing them to customize views to meet their needs. The integrated visual interface provides access to information about what's in use and in inventory, displays element interconnectivity and dependencies, and provides a complete current IT infrastructure view for use in daily activities or strategic planning.

Inside plant application with a specified circuit route highlighted.



For **Outside Plant** applications, Planet IRM provides the ability to manage pathways, conduits, innerducts, splices, manholes, etc. in campus environments and features visual pathway and location management with geo-referencing capabilities. Work sites can be created over GeoTIFF files and elements placed in their actual settings to give a true visual representation of campus locations. Planet's interconnectivity scheme traces how services flow across every pathway and connection, identifies used and dark fiber, and can determine where network redundancies and vulnerabilities exist throughout an organization. This information is critical for an organization's disaster recovery and business

continuity planning and can result in considerable cost savings and heightened situational awareness.

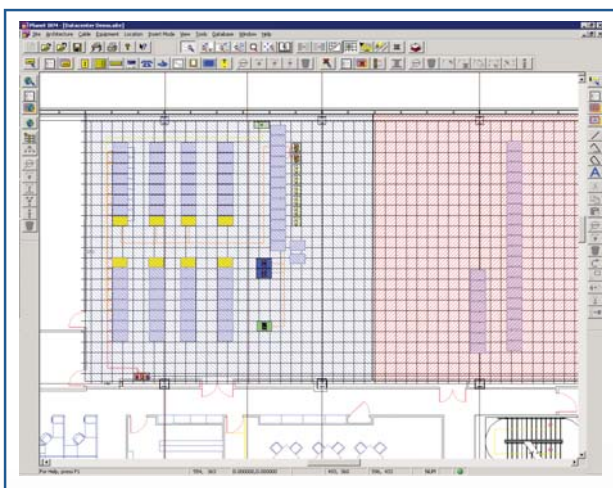


Campus facility showing cable pathways and a hierarchical listing of populated locations and manholes. Manhole butterfly drawings contain cable routing and splice box information.

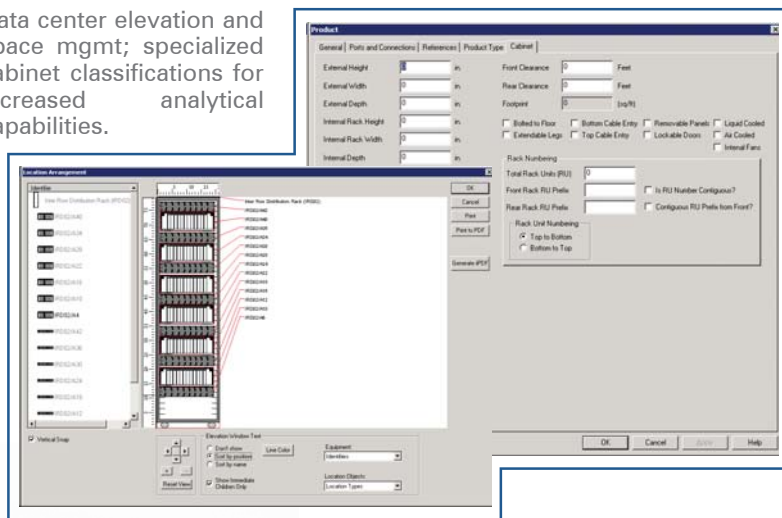


Data Center Management

Planet IRM is a single, centralized software application that goes beyond the basics of heat, power and space management and adds critical connectivity and analysis tools to design and manage data centers. It includes drag and drop rack elevations to scale for accurate design; complete heat, power and space management; comprehensive element connectivity; and electrical, cable and port capacity. Specialized equipment classifications allow extensive analysis capabilities. Visual cable layers make it easy to identify media location and pathways. Planet IRM can be used for incident assessment and response, inventory or insurance reports, and creation of bills of material with cost information. It is an essential tool for use during the processes of Data Center transition, relocation, or consolidation; many aspects of planning, design, implementation, and management can be simplified, improving service levels while expending less time and resources.



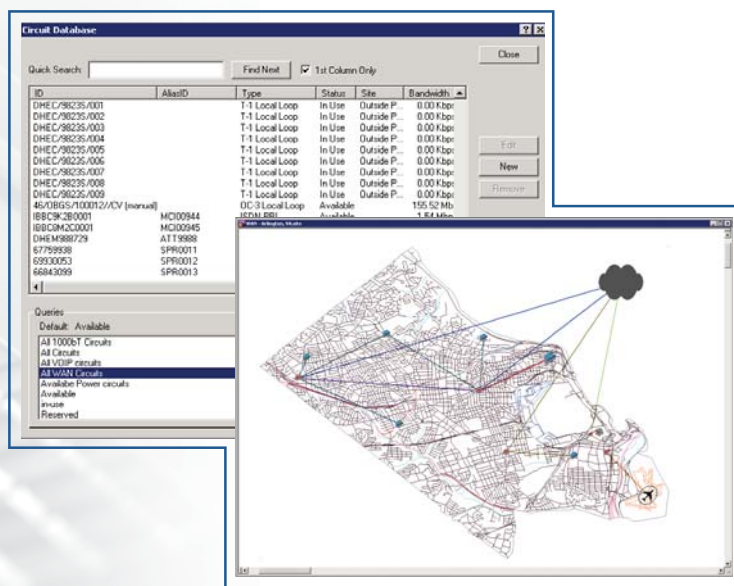
Data center elevation and space mgmt; specialized cabinet classifications for increased analytical capabilities.



WAN Management

The Planet IRM WAN module tracks, manages and documents the entire physical WAN infrastructure, including local loops (OC12, OC3, T3, T1), services (frame relay, ATM, leased lines, MPLS), and virtual connections (PVC, tunnels). Physical circuit paths can be highlighted, enabling users to verify redundancy and visualize the physical separation of network paths. Users can model and trace these paths through many-to-one devices such as switches and routers, or one-to-one devices such as patch panels, port cards, connectors, etc. The visual interface enables users to determine parent circuits, sub-channels, and all connected devices along specified circuit paths.

Planet also has the ability to export billing information into a spreadsheet or comma-delimited file for use with third party financial applications, further simplifying network management needs.

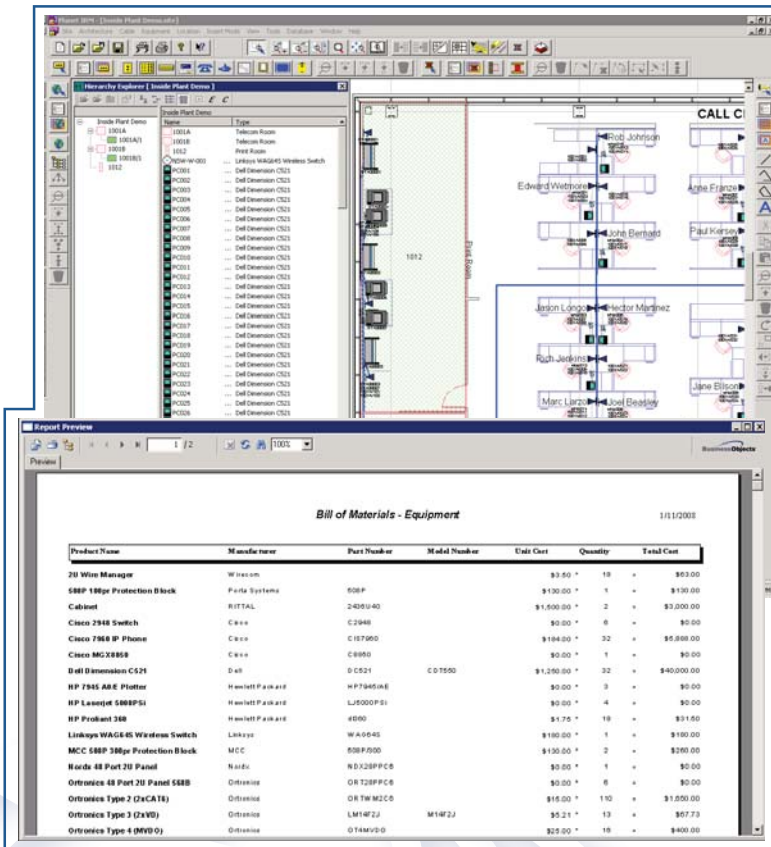


Circuit Database listing and display of WAN connectivity

Inventory Management

Inventories are available in many different dimensions such as region, department, organization, equipment type, or identifier and can be displayed using the geo-referenced visual interface or in text formats via the integrated report engine.

Planet IRM can document all Wide Area and Local Area circuits, devices (e.g. routers, switches, hubs), protocols (e.g. physical layer, link layer, network layer, application services), and cables, as well as the physical infrastructure in which the network is deployed. Planet IRM provides the capability to query the inventory database and generate reports. It has a visualization capability to check inventory lists within any region, area or zone, and interactively navigate through these areas for inventory lookup and examination.



Examples of inventory lists and visualizations. Further details of each element can be found by clicking on it from within the list or view.

User Management

With Planet IRM, user asset information can be consolidated into one application for improvement of accountability, desktop configuration management, and move process flows. Planet IRM enables organizations to centrally manage all equipment assignments such as PDA's, PCs, laptops, cell phones, security badges, etc. in one cohesive database; it associates users and their assets with business functions and physical locations; streamlines tracking of operating systems, software loads, accessibility, and revision levels; integrates easily with existing service support solutions to effortlessly identify all assets associated with moves, adds and changes; and integrates with Directory Services for a single point of entry (via LDAP).



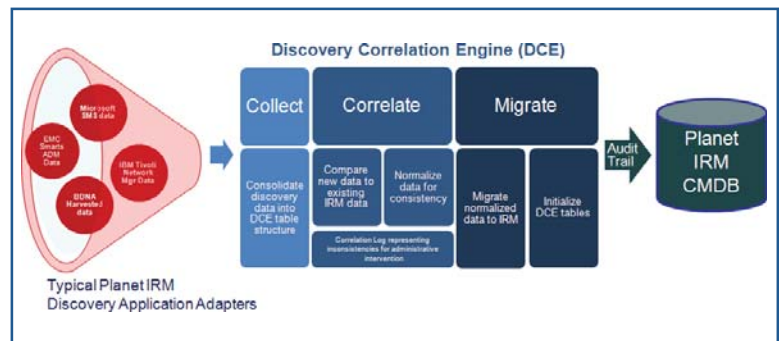
User workstations can be depicted by color to give management a view of how their workforce is distributed.



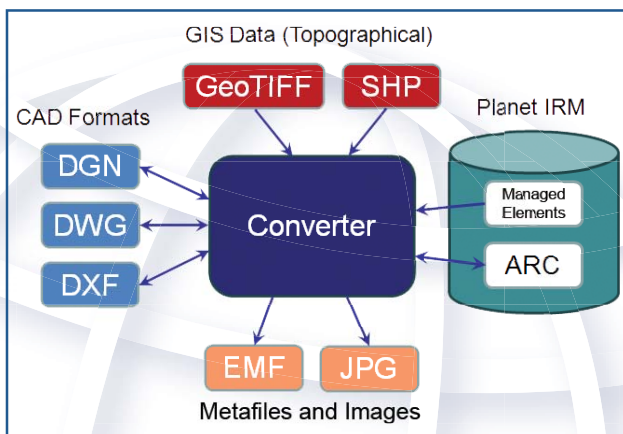
Data Population

One of the difficulties in creating a comprehensive CMDB is the challenge of entering and maintaining all the data associated with an organization's IT infrastructure network. Planet IRM has several related solutions to simplify and expedite the population and maintenance of data in its repository:

The **Discovery Correlation Engine (DCE)** is used to collect, correlate and migrate network discovery system configuration information into the Planet IRM CMDB repository. DCE is used to actively monitor the network discovery database for updates or additions. As changes occur to the discovery source data, DCE triggers automatically correlate the discovery data against the data stored in Planet IRM. For each discovered update, the DCE will automatically create a new object instance or modify the object instance contained in Planet IRM with the newly discovered data and create a time-stamped historic log entry for the effected object type along with a description of the property changes.



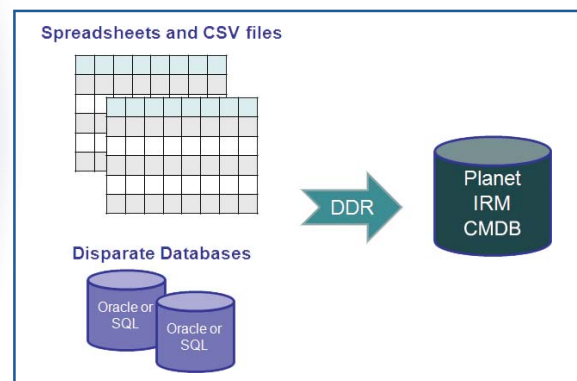
Architecture for Discovery Correlation Engine



Architecture for Converter file utility

The **Converter** application provides conversion capabilities between Planet IRM and computer-aided design (CAD) and geospatial file formats. Converter can be used for creating Planet IRM sites incorporating DXF, DWG, DGN, SHP, MrSID, JPG, TIFF, and GeoTIFF files, thus maximizing reuse of current existing architectural and geospatial data, and greatly minimizing the time necessary for the population of that data into the Planet IRM system. After Planet IRM is launched and in operation, a user can preview, customize and export data in DXF, DWG, DGN, or SHP format to update or for use by other software systems. Converter imports and exports layer information to retain maximum data flexibility after conversion, allowing specific layers within a drawing file to be inserted into other software system repositories.

Dynamic Data Reconciliation (DDR) allows users to import large amounts of data directly from spreadsheets or text-delimited files and automatically create the visual database "on the fly." Through this process, devices are placed on drawings; cables are created and automatically connected; equipment is accurately placed in cabinets; circuits are automatically assigned to paths; and hierarchical relationships of locations and equipment are created. This tool helps Planet IRM move into production quickly and efficiently.



Architecture for Dynamic Data Restoration

System Integration

Planet IRM can integrate infrastructure management data with existing financial, security, human resources, element network, and enterprise management systems to provide a total enterprise solution. It can be integrated with workflow and help desk or service support applications to provide the technology infrastructure details necessary for accurate work orders and timely troubleshooting assistance. Examples include applications like CiscoWorks, CA Unicenter, IBM Tivoli Network Manager, EMC Smarts, and HP OpenView using COM/DCOM, sockets or command line APIs. Rich SNMP interfaces into event management tools send alerts and messages to the Planet IRM system for real-time, integrated system notifications and additional dashboard capabilities through Planet eVolution. The overall integration of enterprise architecture automates business flows, streamlines current processes and ensures that technology infrastructure data is centralized, accurate and available.

Reports

Planet IRM incorporates the industry-leading Crystal Reports reporting engine for comprehensive, flexible, and robust reporting. Any number of management reports and other file or printed outputs can be created using pre-defined reports, including Impact and Risk Analysis supporting disaster planning, MAC Work Orders, Bills of Material, and Circuit Analyses. The Planet IRM application ships with a basic set of over 100 standard reports covering equipment, vendor, circuit, cable, system, pathway, location, and product library categories. Changes to these standard reports and addition of new customized reports are easily accomplished using the full version of Crystal Reports*.

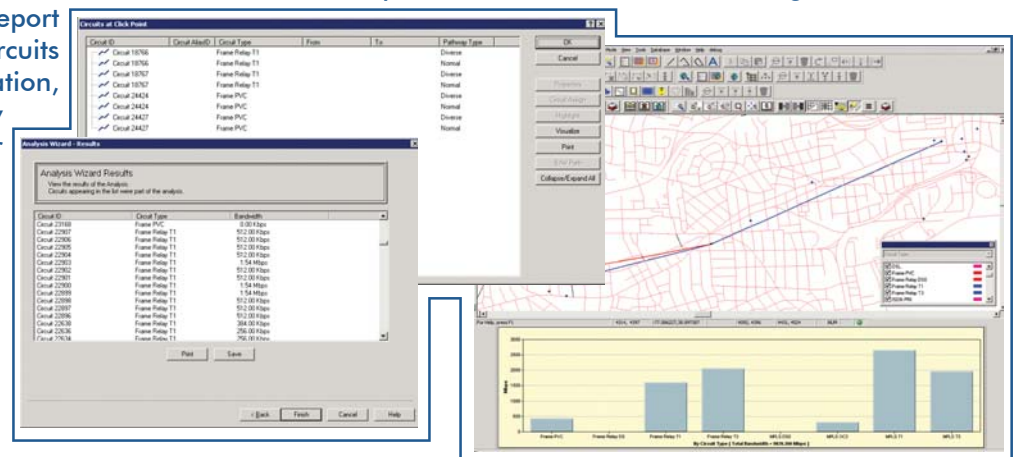
Network Analysis

An important dimension of Planet IRM functionality is the ability to perform various types of analysis within the entire network (or any portion thereof) for creating disaster recovery and business continuity plans, supporting critical infrastructure protection initiatives, determining circuit deficiencies and redundancies, and identifying element dependencies. The types of analysis available through Planet IRM include:

Circuit Analysis

Circuit Analysis is used to identify the circuits and bandwidth upon which entities depend to support information exchange. Important metrics tracked by Planet IRM include the number of circuits from and to an entity (or connected with the entity, when direction is not important), along with numerous properties such as bandwidth and cost which can be aggregated, grouped, or filtered. With this function, a network planner can select one or more regions, areas, zones, or devices and instantly identify, report on and visualize all related circuits graphically by type, organization, contract, bandwidth, or carrier by applying an analytical color scheme.

The results of a circuit analysis within an organization. Selected circuit types are visualized on a map, graphed, and a list is displayed with each circuit's associated source. In application, if it is discovered that too many circuits are running through a particular pathway, re-routing some circuits may be desirable.



* A full version of Crystal Reports is not included with Planet IRM software



Pass-through Analysis

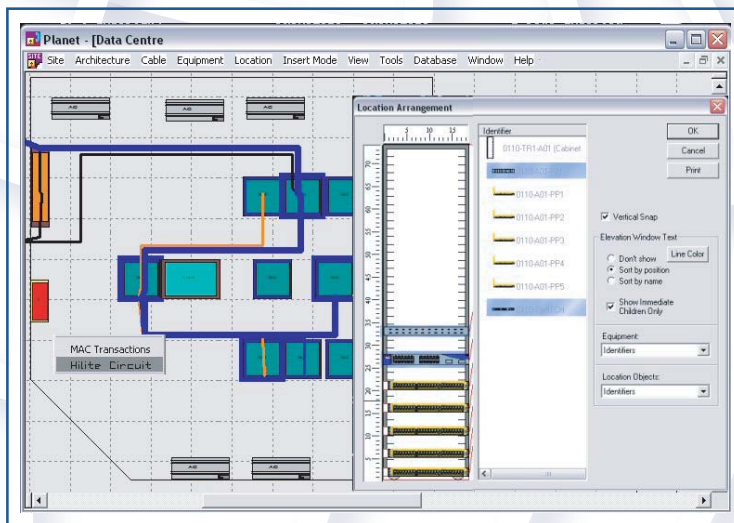
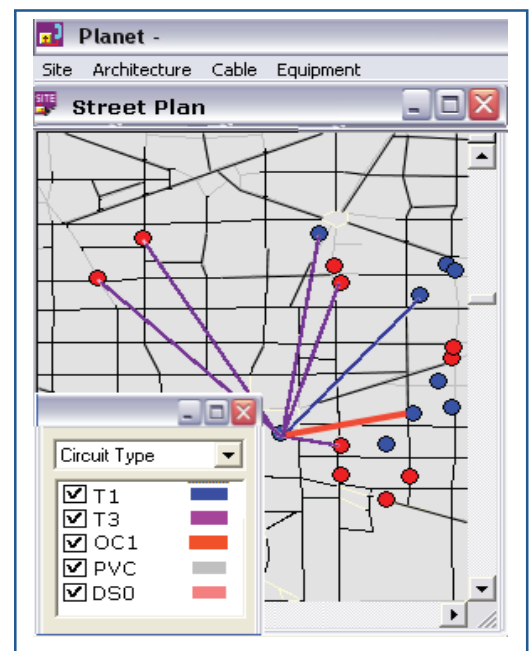
This analysis targets the interdependence between physical infrastructure and cyber infrastructure. When physical infrastructure is destroyed, the supported cyber infrastructure may completely fail or be seriously affected.

The main purpose of this analysis is to identify circuits running through a facility such as a building, pathway, manhole, etc. This pass-through analysis includes circuits used by the facility and those that simply pass through the facility and have no logical connections. The latter are not normally identified in any repository but are very important since damage to those circuits may have a significant impact on other elements and services connected elsewhere.

Element Analysis

Infrastructure elements such as circuits that are physically or functionally shared by multiple Service Delivery Points (SDPs), Central Offices (COs), and Points of Presence (PoPs) are susceptible to failure. By simply selecting any two or more locations or elements within a workspace, a Planet IRM user can immediately identify any circuits and/or COs they have in common and determine potential network vulnerabilities.

This figure shows how Planet IRM's geo-referenced visual database is used to identify several locations that share a common central office within a metropolitan geographic area.



Element Dependencies

This analysis identifies what dependencies exist between IT elements in order to determine the downstream impact of a particular element's failure. Because Planet IRM can maintain the physical relationships between IT assets, services, cables, and circuits, the user can select one or more circuits and determine the organizations, areas, and devices that are connected or routed through it and either display that information visually or print it to a report.

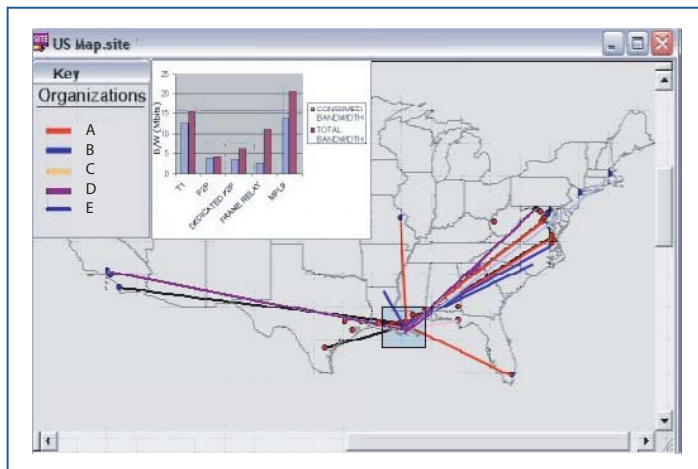
Elements that are potentially affected by the failure of a chosen circuit are highlighted.

Capacity Analysis

Capacity and usage analysis is fundamental for organizations planning for expansion, consolidation and emergency situations such as floods, hurricanes or other major disasters. An organization can quickly determine power availability, bandwidth capacities, cabinet space availability, and equipment port availability using Planet IRM's comprehensive reporting and visual analytical tools.

Bandwidth Capacity Analysis

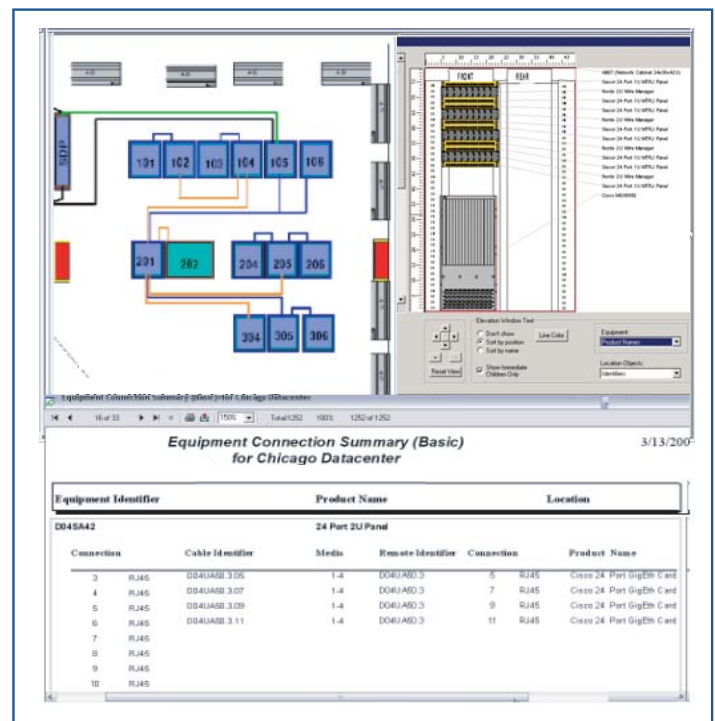
Planet IRM can be used within a region to identify the bandwidth provided by different WAN circuit types along with known current utilization of bandwidth. This ability allows an organization to plan for future growth or assist in consolidating disparate services into a single common service.



Bandwidth analysis for a selected area

Space and Equipment Capacity and Usage Analysis

Using Planet IRM, it is possible to run analytical reports to identify many different types of equipment capacities, whether they are associated with floor space, cabinet space, port availability, power requirements, heat output, and/or ventilation requirements.



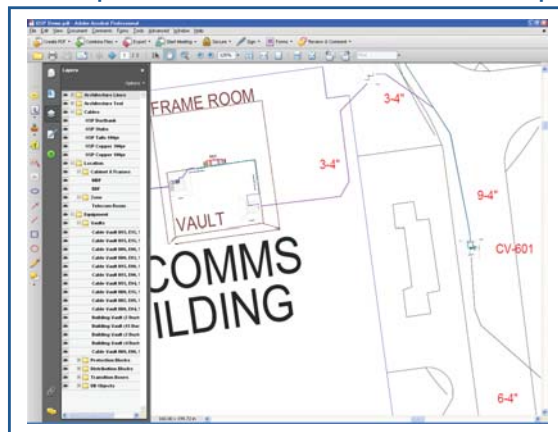
Usage and capacity information for floor plans, cabinets, and equipment ports





iiPDF™

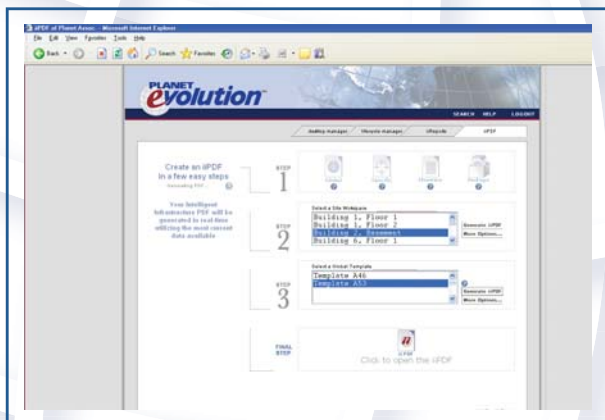
The Planet iiPDF™ (intelligent infrastructure PDF) solution expands the capabilities of Planet IRM beyond the limits of basic reports, drawings and spreadsheets to multi-layered PDF files with options to include embedded tool tips, equipment inventory spreadsheets, parent-child hierarchy links, virtual circuit information, circuit/bandwidth analysis results (in the form of tables or charts), and other enhancements. These resulting password-protected iiPDF files can easily be distributed and viewed with Adobe Reader® software, without accessing Planet IRM. This allows first responders, field personnel and outside contractors to view site-specific critical infrastructure information with as much or as little detail as desired in a form that's simple to understand and manipulate. It also eliminates the need for extensive product training because Adobe Reader users can view detailed multi-layered infrastructure information without having to directly access the Planet IRM application. The Adobe Reader users can manipulate layer visibility and use Adobe's Reader Extension* functionality to annotate changes for later updates to the Planet IRM repository.



iiPDF showing outside plant cable runs and layer hierarchy

Planet eVolution™ Service Center

Planet IRM is a highly sophisticated and complex system. As such, access requires personnel to have extensive training and a direct server connection. To better serve field support personnel and first responders, Planet Associates has developed the Planet eVolution™ Service Center web client for use with the Planet IRM CMDB. Planet eVolution allows less experienced users to distribute complete visual data to the field in a simplistic form for day-to-day procedures or during emergency situations.



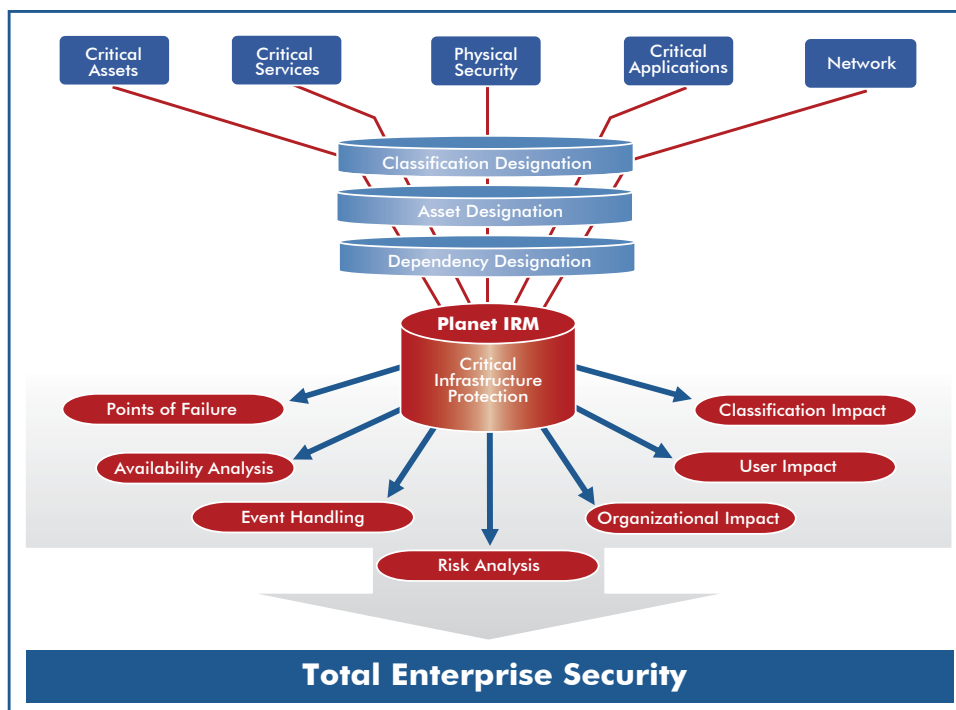
Planet eVolution Service Center with view of the iiPDF creation process

With this innovative system, authorized remote users login to the Planet eVolution webserver over the Internet and have instant access to data stored within the Planet IRM system in the form of iiPDF documents or iiReports. The data can then be viewed, queried and manipulated by minimally-trained personnel, and easily distributed if required.

Planet eVolution Service Center increases Planet IRM's usability throughout an organization by extending a portion of Planet IRM's functionality beyond the constraints of a highly trained operations staff. It is an essential tool for first-responders, field support, and outside contractors: it puts real-time, up-to-date critical data in the remote hands of those who need it most, quickly and easily, while protecting the embedded information with established security mechanisms.

Security

An enterprise-level technology infrastructure solution must provide local administration from a tactical perspective (i.e., limit access to portions of the database to confine individuals to areas within their scope of responsibility) and global governance from a strategic perspective (i.e., allow corporate resources full access).



Within Planet IRM, this is accomplished through Site Workspaces and Security Units. A Site Workspace can be defined as any area from the world down to an equipment rack. Hierarchical relationships exist between Site Workspaces to allow easy navigation. For example, a typical Site Workspace hierarchy for a global enterprise might be:

World ► Country ► State / Province ► City ► Building ► Floor ► Room ► Rack ► Chassis ► Blade

This hierarchy flows down into a tree structure with no limit to the number of levels or branches. Security levels that can be assigned to individual Site Workspaces include *Read/Write*, *Read Only* and *No Access*. Access can be provided to an individual site or group of sites. Users will only see and have the ability to open Site Workspaces for which they have Read/Write or Read Only access rights or iPDF files for which roles and privileges have been enabled.

Any device within Planet IRM can be assigned to a Site Workspace as well as to a Security Unit. All Units are then assigned to a hierarchical tree structure. This structure has no limits to the number of levels or branches. Access rights to the Unit tree can then be delegated to users at any level. Users will only be able to access devices with Units assigned at or below their level of authority. Unit assignments can be imported and assigned through Planet IRM's DDR.

Site Workspace and Unit security are inclusive. This means a user could have access to a Site Workspace, but not to all the Units in that Site Workspace. This is important when different departments or organizations share the same space, as in data centers or large office buildings.



Technology as a Critical Component for Success

Every enterprise and government organization agrees technology is a critical component for success. Technology can help support new developments and services, make information easier to access, and make internal operations faster and more efficient.

The technology infrastructure of any large enterprise is constantly evolving, and change management is a critical issue. Each institution will plan, design, implement, and support thousands of installations, moves, adds, changes, and repairs per month throughout the organization. Typically, most of these events are done on a local basis with loosely defined or ad hoc processes, relying on specific individuals for success. Costs are difficult to manage and operational risks may be introduced.

Organizations can approach change management more strategically by using the Planet IRM CMDB to support well-defined tactical processes that can transcend organizational change and remain consistent across the enterprise. Planet's DDR, DCE and Change Management (MAC) functionality facilitate a consistent flow of current, accurate information as the technology infrastructure evolves. As a result, processes for users responsible for technology infrastructure are significantly improved and become measurable and well-defined, which is necessary to meet quality goals for Critical Infrastructure Protection, Enterprise Architecture, Six Sigma or ITIL.

Summary

Planet IRM combines proven enterprise-level software with years of consulting and service experience, and returns both strategic and tactical benefits. Strategic benefits include enterprise-wide asset control and governance, business continuity planning, crisis management, disaster recovery, and increased stakeholder value. Tactical benefits include increased service to citizens or customers, lower operational costs, reduced incident response times, and compliance with governance regulations.

Planet Associates, Inc., develops, licenses and supports the Planet IRM family of physical infrastructure relationship management software products. Planet IRM is uniquely capable of total enterprise network infrastructure consolidation, with project scopes ranging from individual Data Centers to global enterprise organizations.

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