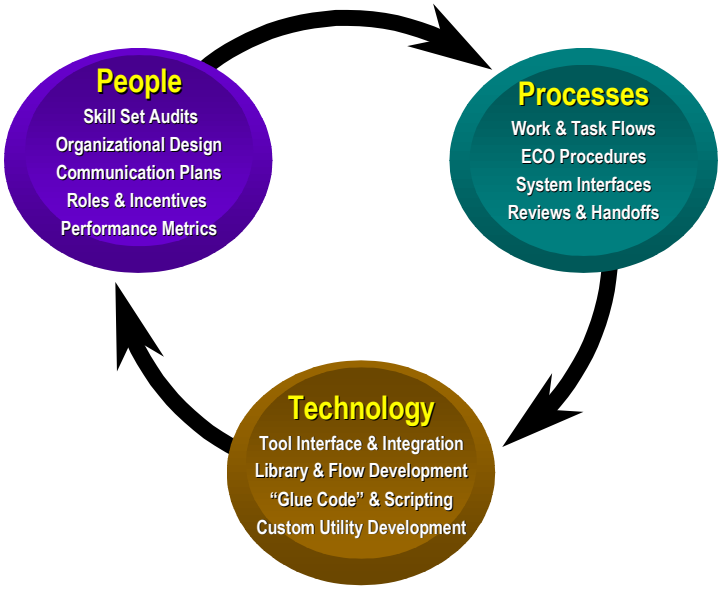
The Cadence/IBM EDA Solutions Alliance

IBM and Cadence have entered into an EDA Solutions Alliance to help customers develop interoperable UNIX/NT design environments in which people, processes, and technology are linked through enterprise-wide access to design information.



The world is moving to Windows NT®, and with the EDA Solutions Alliance, Cadence and IBM have joined forces to get you there, with minimal risk to your design environment and project schedules. The focus of the alliance is to help customers implement integrated design environments where both UNIX® and NT-based professional workstations are in full production use. NT implementation requires IT infrastructures which are different from UNIX environments, and the Alliance has world-class expertise in addressing issues of connectivity, interoperability, and migration between UNIX and NT-based EDA systems. IBM and Cadence have in-depth knowledge of enterprise file systems and global enterprise data sharing for multi-site or inter-company collaborations, as well as a breadth of experience supporting intra-company design teams that span the globe.

The EDA Solutions Alliance provides electronic design customers with a single source for total solutions to UNIX/NT interoperability engineering problems. The alliance

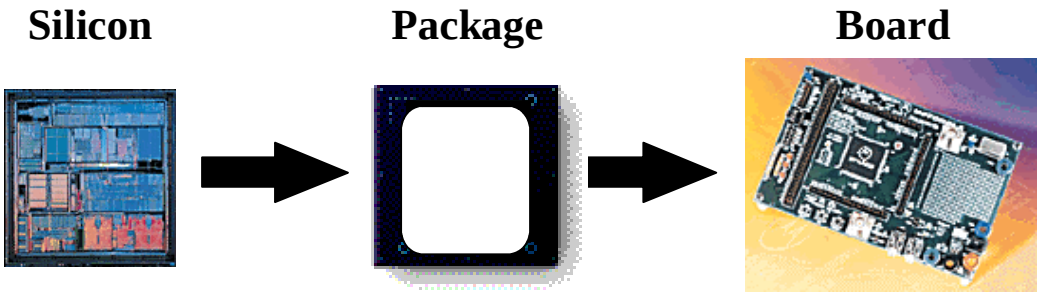
provides "one-stop shopping" for EDA software, hardware, migration, and integration of UNIX/NT data and applications.

Challenges in EDA, Today and Tomorrow

Electronic engineers will soon design massive system chips—ICs that will average from ten to 100 million transistors before the end of the millennium. To achieve a reasonable time to market, engineers now must embrace a design methodology that includes the reuse of existing blocks of logic, or "virtual components." Multiple blocks of semiconductor intellectual property are used on a single piece of silicon, and the sheer volume of design data that must be manipulated and verified places exponentially increasing demands on computing systems. While many front-end ASIC tools are now supported on NT, nearly all high-end layout tools for integrated circuit (IC) design still run on UNIX workstations.

In addition to the IC design challenges, printed circuit board (PCB) designers must meet new technical requirements of high-speed boards. New require-ments for analyzing signal integrity, electromagnetic interference, electro-migration, and timing add to the complexity of the PCB design task. To compound the problem, PCB tools typically run on NT-based workstations, rather than UNIX. Currently, IC designers must hand the project "over the wall" for PCB layout, so integration across the design flow is lacking.

Chip packaging issues, traditionally considered only after the fact, must now be explored in parallel with the IC design effort. System ICs have hundreds of pins, and designers using advanced packages such as ball-grid arrays and flip-chips will benefit immensely from the new packaging design tools from Cadence that sit between IC design and board design. Packaging design tools are available on both UNIX and NT, but a new level of interoperability across hardware and software platforms is needed to make it all play together.



All these tools need to work together seamlessly in an integrated design environment, across time zones and geographical boundaries. To do this, designers require sophisticated data management systems, and they all need access to Internet-based component information systems that reside both inside and outside the company.

Today's Product Design Environment

We are now working in a global marketplace without geographic boundaries. International collaboration, scarce engineering resources, Internet commerce, design reuse, and a mobile work force shape our global economy. The tie that binds the global business infrastructure is shared access to design data and other mission-critical information. For your company to reuse semiconductor intellectual property (IP) and remain competitive, the pathways to this information must be fast and direct, regardless of where the data resides or where it's being delivered.

To bring high-quality, reliable products to market faster, setting up a well-integrated design environment is crucial for meeting complex technical and business challenges. With the advent of very high-performance PC workstations and Windows NT, designers can have a single workstation on their desks to accomplish both design work and get access to business data. As more design tools become available on Windows NT in the future, the NT platform will become a business imperative for cost reduction and efficiency.

Integrating NT-Based Computers into a Design Environment

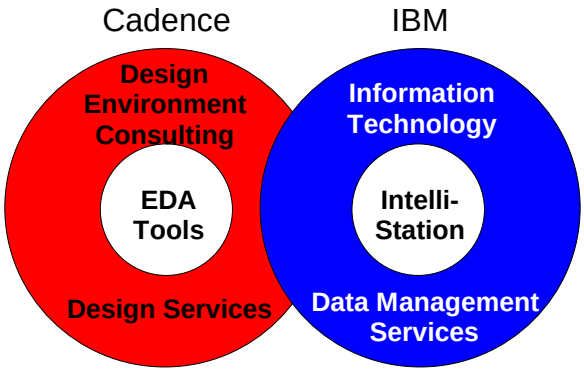
While many design companies want to make use of the price/performance advantages of NT, some have existing UNIX environments and little desire to abandon the stability and investment they have in UNIX hardware and software. But integrating Windows NT-based computers into a UNIX design environment can be a far more complex task than normally attempted by an internal CAD team. A successful integration requires not only design tools that run under Windows NT, but also a redesigned IT infrastructure.

Customers require guidance from vendors who are experienced in setting up UNIX/NT interoperability solutions that will enable their design engineers to make optimal use of the best platform for each given design flow. Customers also need to seek out vendors with the vision to establish solutions that will provide for dynamic changes in the design environment as NT-based design tools become increasingly available.

The right vendor team can provide design process improvements and inte-grate existing EDA tools, create reliable networks, and provide infrastruc-tures and systems to manage your design environment effectively. IBM and Cadence have knowledgeable specialists who can optimize mixed UNIX/NT environments and migrate any design flow your team chooses to run on NT. We can help you build a custom NT infrastructure, either with your current IT team or on a turnkey basis.

Synergistic Solutions From Cadence and IBM

IBM and Cadence offer complementary products and services to electronic design teams worldwide through their new joint venture—the EDA Solutions Alliance. Both companies bring a wealth of services and technology in both hardware and software to the alliance.



The EDA Solutions Alliance offers total engineering solutions to reduce the cost of ownership by leveraging the advantages of the Windows NT computing platform. IBM and Cadence offer a wide range of corporate relationships, expertise, and resources. While the EDA Solutions Alliance features best-in-class technology—both in hardware and software—its unique strength is in the services it offers to reduce the risks in moving to an NT-based design environment.

Cadence Services and Technology

Cadence's reputation as the leading provider of Electronic Design Automation tools is well-known. Cadence provides comprehensive EDA technology and services for the product development requirements of the world's leading electronics companies. Cadence is the largest supplier of software tools and professional services used to accelerate and manage the design of semiconductors, computer systems, networking and telecommunications equipment, consumer electronics, and a variety of other electronics-based products.

Cadence excels in its knowledge of design methodologies, EDA tools, risk mitigation, and services centered around design tools, flows, and design process migration strategies. Cadence offers industry-leading NT-based tools for high-speed PCB design, Verilog-XL simulation, and CAD-to-CAM interfaces. Its vision is to provide not just high-performance "point tools," but rather total productivity solutions for electronic design teams.

Electronic design is becoming more difficult at an exponentially increasing rate. Cadence Services allows electronics companies to become more competitive by speeding their products and ideas into the market. Cadence can provide any combination of design results, processes, and methodology needed to break down the time-to-profit barriers.

Cadence's services model is radically altering the nature of electronic design. From design modeling to turnkey complete design solutions, Cadence's cross-functional teams help solve customer design problems every day, around the world. To ensure optimal results, Cadence has also formed service alliances with other leading EDA providers to enable the use, installation, and support of their tools in tightly integrated solutions.

Cadence Consulting Services are available for electronics companies who want to make extraordinary leaps forward in their product development processes. Using a proprietary methodology along with years of experience in building design methodologies, Cadence can help clients achieve cycle-time reductions of up to 85%, introduce innovative capabilities into existing environments, or build entirely new competencies. Cadence offers a wide range of Consulting Service solutions, which are described below.

Design Process Services

Many important capabilities factor into a successful change project. One essential element is an effective change methodology—a program providing the means to actually "get there from here." The CoEfficient™ Method is Cadence's proprietary methodology for re-engineering electronic design processes. This method has been helping Cadence customers achieve improvements in design capacity (that is, designs per engineer) of 2x–5x, and improvements in design cycle times of 2x–20x.

The CoEfficient Method can be applied in any electronic design environment, regardless of the type of products developed. Based on proven management science practices, Cadence's methodology combines the following five elements into a unique solution for each customer:

1. A Phased Approach

Cadence's transformation methodology manages the complexity of process development projects and mitigates the risk of innovation through carefully planned steps. Each of the three phases—Process Architecture, Process Design, and Implementation—prescribes the exact activities, measurements, and deliverables

required to ensure a successful, predictable, and lasting transformation. Cadence offers several phasing options, which are selected based on the type of problem.

2. Balanced Solution Considerations

Computer-aided systems can dramatically accelerate certain elements of the development process. While Cadence advocates an aggressive use of automation, our experience has proven that enabling technology isn't the first or best place to start a major change project. Cadence's transformation methodology integrates business process considerations with leading-edge technology and organizational considerations, producing the highest degree of time compression and accuracy.

3. Collaboration

Successful transformation depends on partnership. From the executive sponsorship of both organizations, through extensive use of collaborative work teams, Cadence's transformation methodology maximizes innovation and guarantees knowledge transfer from the transformation team to the client organization.

4. Change Assimilation

Effectively guiding people during transformation increases the success rate more than perhaps any other action. Cadence's transformation methodology uses best practices in change navigation, organizational design, and communications.

5. Fundamental Principles of Process Optimization

Cadence's transformation methodology employs the principles of process excellence that have been proven in many management functions. Because electronic product development is more fluid and dynamic than many other operational areas, these principles have been adapted to fit the unique needs of Cadence's clients.

Flow and Methodology Services

Our customers often struggle with design flow and methodology issues. Flows are rocky, schedules are unpredictable, different design groups do their own thing, and libraries are all over the place. These are expensive mistakes—but they're avoidable.

Our Flow and Methodology Services resolve your integration problems. Methodologies are standardized. Unnecessary design iterations are eliminated. Cycle times are reduced. Your design times become more predictable, and your first-time success rate ascends dramatically.

Part of our Flow and Methodology Services consists of modular bundles of services called Serviceware. With Serviceware modules, we create semi-custom solutions to the flow and methodology problems that plague your organization. Serviceware modules address a wide variety of challenges, such as IP reuse, system-level chips, and top-down mixed-signal design, just to name a few. The modules address skill code, specialized design utilities, script development, menus, APIs, data prep, library creation, documentation, and much more.

Point Tool Services

To speed the integration of Cadence tools into your company's design environment, Cadence Consulting Services packages a long list of services for environment integration, library services, glue code development, pilot design, testing, on-going maintenance, CAD augmentation, and QuickStarts.

QuickStarts are prepackaged services to help designers, directors, and managers become proficient with Cadence tools in a hurry. QuickStart services feature on-site software installation, creation of setup and generic technology files, small group assimilation and tool review, and detailed walk-throughs.

Education Services

Cadence Education Services are largely for design engineers and feature a large portfolio of instructor-led courses in circuit, board, and system design. Courses are based on technology and language theory, but emphasize hands-on practical training. To best meet the needs of your organization, we offer a range of delivery options including public classes, private on-site classes, and self-study courses available via the Web.

Technology Integration

Cadence's technology integration services help to speed the integration of new technology into a customer's existing design flow. This accelerates productivity and maximizes the technology investment.

Building the optimal product development environment involves not only a process for transformation, but also a clear vision of the "future state." To accelerate technology integration, Cadence offers a growing industry knowledge base, a collection of product development environment blueprints, and key performance metrics, definitions, and indicators focused on industry and technology measurements of design process excellence. When combined with a client's own

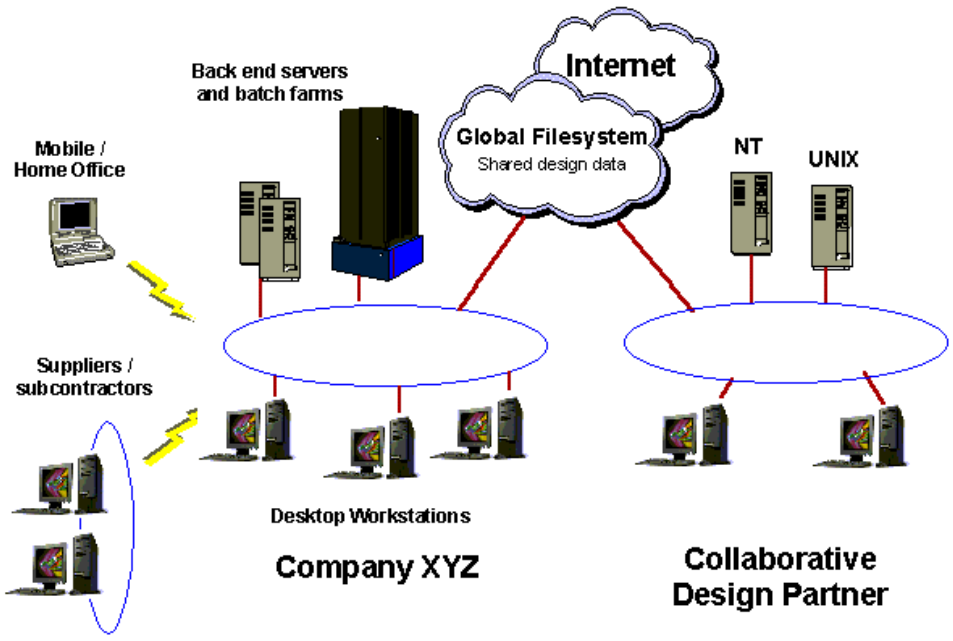
unique experience, this knowledge base speeds the design transformation process and increases the accuracy of the project goals.

IBM Services and Technology

IBM is the world's leading supplier of information technology, including systems, software, and services, and is strongly committed to Windows NT. IBM hardware products include the IntelliStation line, an Intel-based professional workstation designed for NT, as well as Intel-based Netfinity servers and the IBM PC line. IBM is the world's largest software company, with more than 250 software titles available for NT, which is more than even Microsoft offers. Finally, IBM has one of the world's largest NT services groups, with over 4,000 employees dedicated to NT services worldwide.

But while Windows NT is the right solution for many problems, IBM does not view NT as a "one-size-fits-all" solution. Instead, IBM products and services are based on the reality that NT must integrate seamlessly with other plat-forms, and must be both reliable and secure. IBM excels in its knowledge of business and engineering IT infrastructure, with services for system, network, and data management; global file systems; and UNIX/NT integration.

IBM provides a total solution to the customer's business problems, and can help integrate the engineering environment with the rest of the enterprise. For leading-edge Windows NT-based hardware, the design of IBM's IntelliStation professional workstations has been optimized for NT to bring impressive performance, responsive graphics, expandability, and seamless integration into current and evolving heterogeneous work environments.



A growing number of customers are receiving an executive directive to build and implement a robust and reliable Internet-accessible NT-based design and computing environment. Many customers believe that Intel® processors—the Pentium® II, Pentium II Xeon,™ and the much-anticipated IA-64™ technology—have an attractive price/performance ratio compared to UNIX workstations. But this analysis is tempered with the realization that they must continue supporting design flows on UNIX for the foreseeable future.

IBM's IntelliStation family of professional workstations has been developed specifically for integration with UNIX networks. The IBM IntelliStation combines the most advanced Intel Pentium II processors with Microsoft Windows NT 4.0 for 32-bit speed and muscle. Like its UNIX peers, the IntelliStation delivers a robust multitasking, multi-processor design platform. With its enhanced personal productivity tools, designers can easily run demanding EDA tools in harmony with everyday business applications, and you can get more seats for your IT dollar.

The EDA Solutions Alliance helps customers implement network configura-tions, design processes, and middleware to increase the productivity of their design teams. The IBM Global Services division provides unparalleled information technology, and IBM's capitalization resources offer customer financing.[1]

[1] For those who qualify and subject to conditions.

Key Considerations

IBM Corporation recognizes the complexity of UNIX/NT migration and integration. It is often discussed, but few have actually demonstrated a successful implementation, especially on a very large scale. IBM already provides solutions to key customers in support of design teams that span the globe. These solutions are bulletproof, ready for business, and interoperable with the rest of the world. They have been developed to address the key considerations described in the following sections.

Applications Management Considerations

Aim: To develop a process and the necessary tools to manage the application components and identify possible conflicts between applications.

A key factor in the stability of NT workstations is the management of the libraries and registry settings of all applications. IBM creates a structured application management methodology to provide an automated, scalable means to manage applications from the enterprise to the site level.

IBM is a rich source of *middleware*—the "glue" software that connects two otherwise separate applications. Middleware is distinct from import and export features that may be built into an application. For example, middleware products link a database system to a Web server. This allows users to request data from the database using forms displayed on a Web browser, and it enables the Web server to return dynamic Web pages based on the user's requests. IBM middleware can tie disparate applications together into a secure and cohesive whole.

IBM can assist in porting UNIX-based applications and scripts to NT. While third-party tool suites are now available for performing UNIX-like scripting on NT, design groups need to observe guidelines for writing these scripts. IBM can help convert UNIX scripts to ones that are usable within a mixed environment that includes NT.

System Management Considerations

Aim: To develop an integrated suite of system administration tools to perform the most common and most critical system administration activities from a remote central location.

In many enterprises, system administration has been an afterthought during the development and deployment of Windows NT. Few vendors deliver packages that perform all of the functions needed and that are well-integrated with other products.

IBM supports both native and third-party products for managing networks, systems, applications, and business-to-business e-Commerce. Tivoli Systems, an IBM

company, provides tools that perform management operations such as software distribution, inventory, user administration, and distributed monitoring. Instead of requiring applications to sit on the desktop, the Tivoli Management Agent automatically determines what software is needed to perform a given management operation. If that capability already resides on the PC, it immediately proceeds with the operation. If not, the Tivoli Management Agent downloads the appropriate software from the server to the desktop without any operator intervention.

LANClient Control Manager (LCCM) from IBM is another powerful industry-standards-based tool licensed for use with IBM's Intel-processor-compatible clients. LCCM is a Windows NT 4.0 server-based application that supports the setup, configuration, rollout, and ongoing management of LAN-based clients. LCCM is a key component in IBM's strategy to deliver a highly manageable family of client/server products.

With LCCM, IBM reduces the expenses associated with managing an IBM client through the automation of many labor-intensive tasks. LCCM incorporates a "push" approach to client configuration If the client is enabled with Wake on LAN®, the administrator can remotely boot the client and then "push" information to the NT-based workstation, making this a one-person task. LCCM saves significant cost and time by simplifying the effort to change the preloaded operating environment shipped on a workstation.

Global File System Considerations

Aim: To provide a reliable, high-performance, manageable, scalable, secure, production-worthy computing environment—both interactive and batch—for a global design engineering community.

The successful implementation of an NT environment requires a file system and file server that can export data to both UNIX and NT clients. The solution is a single, unified global file system that runs on both UNIX and NT workstations. While NFS or Microsoft CIFS can provide basic file-sharing between Unix and NT, IBM's DFS™ and AFS® Enterprise File-Sharing Products from IBM's Transarc subsidiary have many advantages that are useful in the EDA environments. Some of these include:

- single global namespace (all files, regardless of location, appear in a single file tree, and have the same name from any client)
- better performance and scalability, especially over WANs (using stateful servers, client-side file caching, and efficient wide-area network protocols)
- better security (using Kerberos authentication and ACLs)

- better data availability and reliability (using replication)

These characteristics of DFS and AFS enable workgroups at different sites to collaborate on electronic designs easily and effectively by allowing efficient, secure, and reliable sharing of design data.

IBM's IntelliStation Family of NT-Based Workstations

The IBM IntelliStation family of professional workstations comprises three tiers: the single-processor E Pro desktop, the single/dual-processor M Pro minitower, and the performance-leading IntelliStation Z Pro. Each series targets specific types of EDA applications that are available on Windows NT.

The E Pro 6893 series offers robust uni-processor performance using the latest Intel Pentium® II microprocessors, ideal for design entry and editing as well as layout. Also based on Intel's Slot 1 architecture, the midrange M Pro 6889 is one of the fastest—and most scalable—single/dual Pentium II implementations in the NT workstation industry. The M Pro is designed for more demanding EDA tasks, such as place and route, verification, synthesis, and simulation. The recently announced IntelliStation Z Pro 6865 series—intended for power users who need optimal performance from multithreaded Windows NT applications—is powered by the fastest single or dual Pentium II Xeon™ (Slot 2) processors with full-speed L2 cache. The Z Pro is the choice for the most rigorous regimens of synthesis, simulation, and physical design.

Advanced Platform Technologies

IBM was one of the first professional workstation suppliers to introduce Intel's 450 MHz[2] Pentium II microprocessor in its E Pro and M Pro lines, as well as early to market with the Pentium II Xeon in the Z Pro line, ensuring users the highest levels of productivity on the NT platform. The IntelliStation M Pro 6889 is an SMP-capable (symmetric multiprocessor) machine that gains IBM a price/performance advantage over many of its leading competitors—including UNIX workstations. IBM has proven to be an innovator in the professional workstation space, featuring leading-edge technologies such as integrated RAIDport, AGP 2X support, and high-resolution flat-screen displays that are ideal for multi-monitor environments.

[2] MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.

Investment Protection

IBM has focused its IntelliStation design efforts on buyer investment protection. The IntelliStation series provides true scalability with flexible configurations of PCI/ISA slots and device bays, and tool-free enclosures that offer easy access to memory, internal bays, and graphics adapters. These system designs ensure that the IntelliStation can accommodate new add-in capabilities as needed, extending the service lifetime of the workstation and delivering superior return on investment.

In addition, IBM's SystemXtra services—including training, on-site recovery assistance, and network maintenance—can be combined with IBM's Technology Exchange, a flexible program that enables companies to upgrade their leased IntelliStations to the latest IBM workstation technologies after only two years.

Service and Support

IBM is focusing its vast Global Services organization on providing support programs for customers who are looking to deploy large volumes of professional workstations. IBM will offer programs to support its indirect channel partners who specialize in serving the needs of users in the EDA market segment.

The IBM IntelliStation is Year 2000-compliant.[3] In addition, IBM offers comprehensive services to work with clients to identify and fix Year 2000 bugs in existing systems. For information regarding Year 2000 compatibility and services, visit the IBM Year 2000 Web site at www.ibm.com/pc/year2000.

[3] This product is Year 2000-ready. When used in accordance with its associated documentation, it is capable of correctly processing, providing, and/or receiving date data within and between the 20th and 21st centuries, provided all other products (for example, software, hardware, and firmware) used with the product properly exchange accurate date data with it.

The Power of the IBM/Cadence EDA Solutions Alliance

Together, IBM and Cadence have established the EDA Solutions Alliance to serve as a powerful force to provide customers with a single, "one-stop shopping" environment. The IBM/Cadence EDA Solutions Alliance can help you build the custom IT infrastructure you need to lead you into the 21st century and beyond, with:

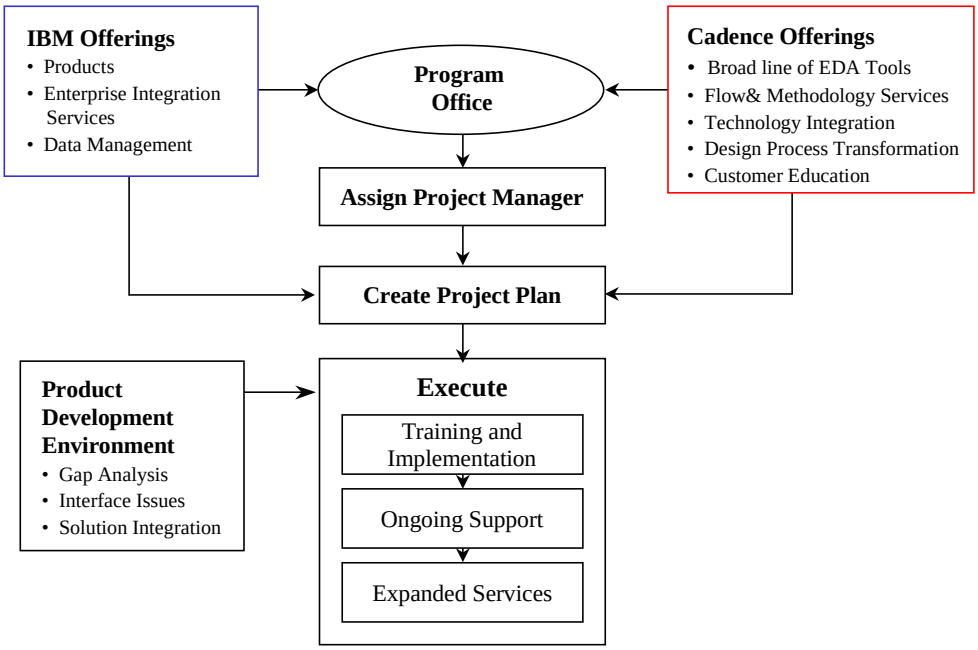
- Delivery of high-performance, integrated design tool flows and methodologies for electronic products
- NT-based design environments which enhance designer productivity
- IntelliStation computing networks that optimize interoperability
- Systems management to help control assets and assure safe inter-company design environments using the Internet
- Financing options for the total solution environment

With this strategy, you can protect your engineering investments against technology obsolescence. We can help your company to migrate from older versions of EDA software to the latest versions on NT, helping to manage risk factors during software upgrades and changes in design methodology.

This single point of contact for an enterprise-wide design engineering solution also reduces the total cost of deployment—for installation, integration, and support of hardware and software. Once a system is deployed, a comprehensive systems management strategy can save up to 10% on the total cost of ownership for desktop systems, and as much as 20% for network servers.

How the EDA Solutions Alliance Works

A central Program Office provides a single point of contact for marketing and sales support of EDA NT solutions with both IBM and Cadence. The Program Office coordinates the delivery of an IBM/Cadence EDA solution, and a cross-disciplinary team of experts is quickly deployed to address your unique requirements. You get the benefit of one-stop shopping.



The Program Office names a project manager who assembles and leads a joint team in developing and executing a project plan. A unified team is then made up of sales and support personnel from both IBM and Cadence, depending on the skill sets and solution offerings that will best fulfill your unique set of requirements.

If you are considering moving to a Unix/NT interoperability environment, or directly to an NT design environment, consider the Cadence/IBM Program Office as your guide to the future. Contact us at the address below or call your Cadence or IBM sales team.

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For IBM product and dealer location information	1-800-426-2968
To access the IBM PC Company Bulletin Board	1-919-517-0001
For product information sent directly to your fax machine	1-800-IBM-3395 (1-800-426-3395)

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