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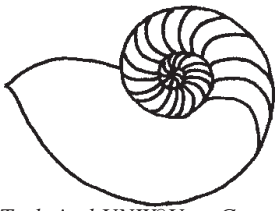

TUUG Lines

Technical UNIX® User Group

Newsletter of the Technical UNIX® User Group

A New Year, A New Look

Welcome to a new year of the Technical Unix User Group. We hope to see big things happen within the group this year. The symposium that we organized, along with the Winnipeg chapter of the Canadian Information Processing Society, is by far the most ambitious project our group has taken on to date. It is hoped that the momentum will continue on for some time to come, with increased membership, and increased membership involvement in group activities.

One of the significant changes you are likely to see within the group this year is a diversification of the group's membership, and a greater diversity of topics being covered at the meetings. Just like the symposium featured three tracks of seminar topics, aimed at novice, technical, and management audiences, future meetings may take on a similar direction, with topics geared to all three audiences, possibly on alternate months.

THIS MONTH'S MEETING

Meeting Location:
The November meeting location will be provided by XCAN Grain Ltd. XCAN is located in the TD Tower at 1200 - 201 Portage Avenue. Please enter at the front door. Please sign in at the security desk and use the company name of TUUG. We hope to see you at the meeting.

Meeting Agenda:
See inside.

In the spirit of the changes going on within TUUG, the editor of the newsletter (a new editor this year, by the way) felt that a change in the look of the newsletter was called for. We hope that you like the new look, and the new direction we hope to take on, both in the newsletter's content, and in the group's meeting content.

As you look inside, you'll see articles on a variety of topics. We hope to continue this, and we will try to provide something for everyone in each issue. Enjoy the new year, enjoy the new format, and by all means, give us some feedback on what you would like to see covered in the future.

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From The Editor's Desk Top

By Gilbert Detillieux

Well, here I go, on my first newsletter as editor. As I sit here typing and laying out text, selecting fonts, sizes, boxes, and so on, I'm wondering why I decided on a "new look" for the newsletter after all. What was wrong with the old look? Do I really have the time to be fussing with all this when I should be working on other things, like my symposium presentations? Is it really worth all the trouble?

But then, I've always felt that anything worth doing is worth doing well, and that goes for this newsletter too, both for content and presentation. The new layout, I hope, will be attractive, attention-grabbing, readable, and organized in such a way that information will be more quickly found.

As you look at the cover page, you'll quickly find the summary of the newsletter's content, all the details you need about the location of the next meeting, and any other important story or news items. Page headings will help you quickly identify the general focus of each article. I hope to include in each issue at least one article aimed at each of our three audiences: technical, novice, and management.

This is where you, the readers, come in. In order to meet your needs, I need to know what you want to see. Please send me articles, news items, letters (even if it's just to complain about the new look), or anything else you'd like to see in print. Remember, this is *your* newsletter, I just compose it.

The 1991-1992 Executive

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Group Information

The Technical UNIX User Group meets at 7:30 PM the second Tuesday of every month, except July and August. The newsletter is mailed to all paid up members one week prior to the meeting. Membership dues are $20 annually and are due at the October meeting. Membership dues are accepted by mail and dues for new members will be pro-rated accordingly.

Welcome to a New TUUG Year

By Susan Zuk, President

Welcome to a new TUUG year!! We plan to bring you a year filled with interesting meetings and some fun thrown in for good measure. Watch for a schedule of events in upcoming newsletters. I would also like to welcome the new 1991–92 executive. The December newsletter will include an introduction of the this year's executive members. If you are interested in helping and volunteering some time to the group please contact any of the executive. We always can use a helping hand. Also, if you have a topic which you would either like to present or would like presented give Eric Carsted, our Meeting Coordinator a call.

I would like to provide you with some information about the group. The Technical UNIX User Group was founded in the fall of 1986 (This is our 5 year Anniversary). It was thought that UNIX was starting to be a growing concern in Winnipeg and it was felt that there was a need for sharing of information. Meetings were held at the Basic Medical Sciences Building at the Health Sciences Centre and we had gatherings of about 6 to 8 people on the second Tuesday of every month. UNIX was quite unknown in Winnipeg and so the group remained basically "underground."

In the past year, there seems to be an upsurge of interest in UNIX as well as in the user group. UNIX has shown itself to be a viable alternative and Winnipeg UNIX installations are growing. Our organization is also experiencing a fast growth rate. Phone calls are quite frequent and membership is on the rise. With this being the case, we thought that Winnipeg was ready for a UNIX Symposium. Well, it looks like we were right! The response from vendors, the community (volunteers) and registrants has been overwhelming. The theme of Open Systems is a popular topic. Trying to come to grips with the meaning of Open Systems can be exasperating. We hope to help you obtain a clearer understanding of this new buzz phrase at the show as well as in the article featured in this newsletter. I hope you are taking advantage of this opportunity to gain knowledge in this area especially when it is provided right in this city. See you there!!

I would like to thank the following people for their involvement and commitment to bringing this symposium to you. Time is such a precious commodity and these people have given endless hours in attending meetings, offering opinions and providing much needed help. Hats off to Jim Medill, Bary Finch, Kathy Norman, David Young, Eric Carsted, Patrick Chan, and Kirk Marat. An extra special thanks to a few very important people: Richard Kwiatkowski for helping with advertising and always giving his best, Al Hykaway for being a great co-chair and agreeing to have CIPS collaborate with our group, and Gilles and Gilbert Detillieux who were always there when a hand or shoulder was required and also for being great friends. I would venture to say that it has been a job well done.

Year-End Financial Statements

October 1990 to September 1991

By Gilles Detillieux, Treasurer

Balance Sheet

	Mar '91	Sep '91
Assets:		
bank account	899.13	889.77
cash on hand	76.00	
	975.13	889.77
Liabilities:		
accounts payable		
- postage	105.58	346.39
- paper	9.77	32.05
Total	115.35	378.44
Equity:		
net income to date	426.15	77.70
retained earnings	433.63	433.63
	859.78	511.33
Total Liabilities + Equity	975.13	889.77

Income and Expenses

	Mar '91	Sep '91*
Income:		
membership dues	596.00	622.00
Expenses:		
Christmas party	52.61	52.61
barbeque		75.94
bank service charges	1.89	2.52
postage	105.58	346.39
stationery		
- envelopes		34.79
- paper	9.77	32.05
Total	9.77	66.84
Total expenses	169.85	544.30
Net income	426.15	77.70

* Sep '91 income and expenses are for whole year (Oct - Sep)

Implementing an Open Systems Architecture

The idea of Open systems has drawn the attention of the entire computer industry. Strategies for Open Systems examines ways to begin building them.

By Burnes Hollyman and Lyle Anderson

Reprinted with permission from the January 1991 issue of CommUNIXations, published by UniForum.

Unix vendors, developers and other supporters have been promoting the cause of open systems for some time now. They see organizations moving to open systems as in effect adopting a new paradigm in information technology. This new approach would be based on client/server architectures, network computing, industry standards, graphical user interfaces and engineered software development. It would replace the old paradigm of proprietary solutions that periodically must be replaced or expensively upgraded; centralized processing by large, monolithic computers; and character-based dumb terminals on the user end.

Until now, evidence that this shift is occurring has been anecdotal and sporadic. However, the Strategies for Open Systems program, sponsored by UniForum, X/Open and DMR Group and conducted by DMR, has found substantial proof that not only is this change under way, it is being driven by business needs.

The study reveals that growing numbers of organizations are adopting open systems to reduce hardware, software and support costs; to manage the risk of being locked in to any one vendor; and to achieve a more rational procurement process. The evidence is strong that substantial benefits are actually being achieved in these areas.

The emerging drivers for open systems go far beyond the traditional view of benefits. The project team found strong indications that computing's first paradigm shift is driven by a business need for more flexible, powerful, integrated architectures that can meet a new set of business requirements.

The study identifies a growing group of organizations that seek to use informations technology to improve effectiveness of products and services; to link with customers and suppliers; and to improve the effectiveness of their managers and professionals.

The survey of 2,375 U.S. establishments having more than 50 employees found significant business payoff associated with the adoption of open systems. The study quantifies important links between business drivers for competitiveness and technical innovation through the use of open systems. For example, where technology investment is driven by business needs such as improved customer communication or faster decision-making and new product delivery time, open systems and UNIX are used about twice as often as in the general population.

Business effectiveness needs also drive investment in many innovative technologies such as major new applications, heterogeneous networks and advanced development methods. In turn, use of these new technologies is a predictor of open systems adoption and UNIX use.

Consideration and Commitment

While the group of open systems adopters is growing, it remains small. To paraphrase Mark Twain on weather, "Everybody is talking about it but nobody is doing anything about it." That is, open systems policy as a high-level architectural commitment does not yet exist widely. The study shows that most organizations using open systems-based technology do not say they have adopted open systems standards.

For example, although UNIX was found in 24 percent of surveyed establishments, only 6 percent say they have adopted open systems standards. This finding is more surprising in light of the fact that 55 percent of respondents agree or agree strongly that they would use open systems technologies if they communicated well with their existing systems and applications. SImilarly, 42 percent agree or agree strongly that open systems are important to them. And 23 percent agree or agree strongly that open systems standards will be widely used in their industry.

Only two markets, data processing and the federal government, stand out as having a sizable penetration of early adopters. However, consideration of an open systems policy has occurred in 15 percent of all establishments.

Standards and Savings

While many companies have purchased UNIX-based solutions, the DMR project team found through case study and qualitative research that UNIX is often selected for immediate reasons, such as the best application solution being available on a UNIX platform or better price/performance in a UNIX solution than in a proprietary offering. This rationale is different than making an architectural commitment to open systems.

However, once UNIX gets its "foot in the door," the door is likely to stay open. Adopters of standards or standard technologies find benefits that then raise the broader question of company architecture. When a company decides to move to a standards-based architecture, it typically justifies doing so by reducing or avoiding costs in hardware, software and personnel.

Hardware. Various hardware savings were identified by users:

Increased leverage in the bid cycle. A competitive Request for Proposal that stipulates standards permits a more level playing field, basing competition on price.

Scalability. As hardware requirements increase, an open architecture allows hardware upgrading on an incremental basis instead of swapping out an entire proprietary solution.

Reduced service and maintenance costs. With simplified vendor environments and commodity parts, open systems reduce the overall costs of service and maintenance.

Reduction in vendor diversity costs. An enormous amount of organizational time and expense is dedicated to maintaining diverse environments. These costs include skill, personnel and maintenance as well as actual time spent in meeting with various vendors. Open systems reduce these costs.

Reduced migration costs. One of the major reasons that users maintain proprietary environments is that migrating to other platforms is prohibitively expensive. A standards-based architecture allows users to migrate between hardware platforms on a more timely basis.

Software. Users also identified significant savings in key software areas:

Centralization and coordination of development. Savings can be gained by eliminating repetitive rewriting and maintenance of diverse software environments.

Application development. Users are increasingly deciding to purchase standards-based "shrink-wrapped" solutions instead of developing customized solutions that do not offer sufficient incremental benefits relative to the large costs associated with development staffs, project cost overruns, training and overhead.

Maintenance. If an enterprise has to maintain many application environments with unique tools, techniques and personnel skills, reducing to a few environments may yield significant savings.

Programming support across incompatible systems. Major benefits can accrue if an organization can decrease the amount of overall programming support required to maintain diverse systems and applications.

Preserved investment in a database. One of the most significant areas where users are locked in by proprietary technology is the database. SQL-compliant interfaces allow diverse databases to interface without a prior database rewrite.

Database design, data capture, entry and management. In developing new databases, standards designed into open database activities permit greater flexibility and lower cost.

Business and Human Costs. Significant savings were found in a number of key business and human areas. In many instances, these benefits outweighed those derived through direct hardware or software cost savings:

Job redesign and work processes. When end users redesign customer service functions in conjunction with the introduction of new standards-based technology, organizations obtain major productivity gains.

More time for business challenges. When enterprises standardize and are not required to divert time to maintaining an installed base of diverse proprietary technologies, this time can be refocused on key business issues, such as how to serve the customer more efficiently.

Training costs. The DMR project team found notable examples where training costs were reduced significantly as work flow and transactions were streamlined in association with the introduction of open systems.

Personnel costs. As a result of the introduction of standards-based environments, overall personnel costs were reduced.

Architecture Planning

Despite these factors, cost savings were not the dominant drivers for organizations that made the strongest commitment to standards-based architectures. These organizations concluded that standards were the only way to achieve powerful, flexible, client/server network computing architectures. They realized that no one vendor can solve all their information technology needs, nor can developing custom links between proprietary offerings. As a result, a shift is now occurring to an *architecture* that is owned by the enterprise rather than a *productecture* owned and controlled by a vendor.

To migrate to open systems, and enterprise must develop an entirely new approach to technology — that of standards-based architecture planning. The project team concluded that the lack of such an approach is the key ingredient holding back open systems growth in advanced organizations.

Standards and open systems mean little if they are not related to an enterprise's overall technology architecture. A *multivendor environment* is characterized by distinct and unique environments that are required to work together at the enterprise level. This cooperation requires a high degree of technical and operational coordination. In most organizations, however, this occurs on a patchwork basis.

A standards-based architecture in an open systems environment offers the promise of allowing these diverse environments to interoperate effectively. A key characteristic of such an environment is the critical need for *regulated standards*. As standards continue to evolve, one of the challenges that organizations face is to define the minimum degree of standardization that will ensure the integrity of the architecture. This should be embodied in products and services that can be chosen and purchased as needed.

Selecting Standards

While it may be desirable to move toward products based on open standards, few products are currently available. The process of defining standards is complicated by the myriad assortment of de facto standards, de jure standards and so-called standard products offered today.

The challenge is to select the standards that will endure in commercially available products. The study suggests that a transition is occurring from proprietary products to ones based on open systems. But in many cases these products may be three or more years away from commercial availability.

Therefore, two major questions have to be dealt with in standards selection: Will the standards have a reasonable selection of commercially available products and services

that embody the standards? Will the selected standards support gradual migration of an organization's technology architecture to a more open environment? Likewise, can the standards support coexistence of open and proprietary solutions?

Unfortunately, these issued make the selection of standards a compromise between what can be done today and the promises of tomorrow. The result is a set of standards that will evolve over time. The architecture process is dynamic and changing constantly to address new business, technology and standards issues.

Standards Issues

Organizations cannot move to a standards-based architecture overnight. Because there are major obstacles in its path, migration occurs in phases. The following issues must be taken into consideration when planning a standards-based architecture:

- Embedded "legacy" systems must remain in place for some time, for reasons of investment or work-force resources.
- Open system products that implement de jure standards do not exist for many requirements.
- Proprietary solutions can provide effective price/performance solutions if the larger cost savings associated with implementation of open systems are not well understood.
- Implementing technological change is as much a cultural, organizational and political challenge as it is a technical process.
- Technical personnel define the information technology agenda without sufficient linkages to a process and business case in which business players set the agenda.

Steps Toward Standards

The greatest obstacle to implementing open systems is the lack of a planning and implementation process that identifies common requirements for standards-based systems. DMR Group has developed an approach to standards-based architecture outlined below:

1. Architectural Framework. First, sketch a general definition of the current environment and a direction for the target architecture. Develop architectural principles, organizational vision, policies, standards and guidelines. It is extremely important that the architectural principles are agreed upon by the various constituencies within the enterprise. This process should be driven by business-oriented professionals rather than technologists.

2. Baseline Definition. Inventory and document the current application and technology foundation. Categorize existing hardware and software, and attach application, hardware, software and business cost values to them.

3. Target Architecture Definition. Determine the fundamental issues concerning what standards should be adopted where and when. Calculate the cost savings or business benefits of the new architecture. Compare this to the existing architecture for business quantification of technology programs.

4. Opportunity Identification. Sort opportunities into payoff categories. Place a short-term focus on identifying one major project that will provide tangible benefits. Key this payoff project to business manager bonus programs to ensure its implementation success. The true test of an architecture comes when someone's compensation is tied directly to its success.

5. Migration Options. Develop alternatives for the new target architecture. This includes analyzing various implementation options. In general, conversions to open platforms are to be avoided. It makes more sense in cost benefits to build new applications on the new platform.

6. Harvesting Benefits. This step is a traditional implementation plan. It should provide a marked focus on short-term payoff programs, derived from the new standards-based architecture. These are identified, categorized and, where appropriate, harvested. The project team adopted this approach because the 10-year strategy approach fails more than 90 percent of the time. Increasingly, businesses are seeking "fast-path," high-payoff solutions rather than long-term plans that are never implemented.

7. Reality Testing. Continually conduct stress tests of the new architecture to ensure that it works. Modify the architecture as the business, organization and technology change. Part of the process includes technology forecasting to "innovation-proof" the new target architecture.

Until now, open systems have been the special domain of government procurements. The time has come to move the concept of open systems as a high-payoff proposition into the mainstream of commercial information technology usage. This will occur only as information technology organizations are able to develop target architectures based on industry standards; to mix and match their proprietary environments with open ones; and to formulate migration strategies that enable incremental, cost-beneficial implementations of the new architecture.

Through the Strategies for Open Systems program, Over 120 commercial enterprises, government departments and technology suppliers are cooperating to develop a planning and implementation process whereby open systems can move beyond the 6 percent of adopters to become a mainstream reality.

Burnes Hollyman *is director of emerging technologies consulting for Boston-based DMR Group.* ***Lyle Anderson*** *is DMR's national director of architectural consulting services. Both were key consultants and authors on the Strategies for Open Systems study.*

Strategies for Open Systems is a multi-million-dollar syndicated program investigating open systems technologies, use, standards, problems and management. A major goal of the program is to clarify open systems directions and issues, based on primary research.

For more information, contact DMR Group, Inc., at (617) 695-1980.

Finding a Specific Newsgroup

An excerpt from Navigating Usenet

By Dave Taylor

Reprinted with permission from the March 1991 issue of CommUNIXations, published by UniForum.

While there are many different programs available by which to read the news (similar to the bewildering variety of different editors), a few packages are quite popular, especially *rn*, written by Larry Wall. Available through a number of sources, including user-contributed software libraries from various user groups and often UNIX vendors themselves, *rn* offers a blend of sophistication and easy interaction on a command-line-based interface.

To get a feel for how to wander through Usenet, let's look for any groups that talk about laptop computers. Start by simply invoking *rn*:

```
$ rn
Trying to set up a .newsrc file-running
newsetup...  Creating .newsrc in /users/
demo to be used by news programs.  Done.
```

If you have never used the news system before, you may find the articles in news.announce.newuser to be helpful. There is also a manual entry for *rn*.

To get rid of newsgroups you aren't interested in, use the *u* command. Type *h* for help at any time while running *rn*.

```
Unread news in general     1 article
Unread news in ba.announce 1 article
Unread news in ba.food     1 article
Unread news in ba.forsale  1 article
Unread news in ba.general  1 article
********   1 unread article in general-
read now? [ynq]
```

Ynq signifies *yes*, *no* or *query*; the default is yes. At this point, you'll follow the suggestion on the third line, and user the *g* command to go directly to a specific newsgroup, in this case "news.announce.newusers."

```
********   1 unread article in general-
read now? [ynq] g news.announce.newusers
********   4 unread article in
news.announce.newusers-read now? [ynq]
```

You can now use the = (summary) command to request a summary of the different articles unread in this group:

```
********   3 unread article in
news.announce.newusers-read now? [ynq] =
580 Answers to Frequently Asked
Questions
581 USENET Software: History and Sources
582 List of Active Newsgroups
********   3 unread article in
news.announce.newusers-read now? [ynq]
```

The information presented by the summary is the article number and the subject of the article. You can read an article simply by typing the article number at the prompt:

```
********   3 unread article in
news.announce.newusers-read now? [ynq]
582
```

This displays the first screenful of the article:

```
Article 582 (3 more) in
news.announce.newusers
From: spaf@cs.purdue.EDU (Gene Spafford)
Newsgroups:  news.announce.newusers
Subject: List of Active Newsgroups
Date: 8 Nov 90 17:51:02 GMT
Organization: Purdue Univ.

     [Most recent change: 8 Nov 1990
  by spaf@cs.purdue.edu (Gene Spafford)]
The following is a list of USENET
newsgroups currently active as of Nov.
8, 1990. The groups distributed
worldwide are divided into seven broad
classifications: "news", "soc", "talk",
"misc", "sci", "comp" and "rec". Each of
these classifications is organized into
groups and subgroups according to topic.
"comp" Topics of interest to both compu-
ter professionals and hobbyists, includ-
ing topics in computer science, software
source, and information on hardware and
software systems.
"sci" Discussions marked by special and
usually practical knowledge, relating to
research in or application of the estab-
lished
-MORE- (14%):
```

You can now use the standard UNIX *grep* command by piping the article into the pattern searching command with the | command:

```
End of article 582-what next? [^Nnpq]
|grep laptop
comp.sys.laptops    Laptop (portable)
computers.
End of article 582-what next? [^Nnpq]
```

You've finally arrived at "comp.sys.laptops." Now that you know the *g* — go to newsgroup — command, you can use that to move to that group directly, then use the = (summary) command to find out what articles are available. Via *q* you can quit back to the UNIX shell when you're done reading Usenet.

Dave Taylor *is president of Intuitive Systems, a consulting firm in Los Altos, CA, which specializes in internationalization, user interface design and software marketing. He is a contributing editor of* CommUNIXations.

R4000 RISC Microprocessor Introduced

R4000 to Vie as Standard for Mainstream Computing

Editor's note: The following is a press-release by MIPS Computer Systems, Inc., that recently appeared in the comp.newprod *newsgroup. It is being included in the newsletter, verbatim, as the editor feels it documents a significant new technology, and as such, would be of interest to many group members.*

San Francisco, Calif.—Oct. 1, 1991—MIPS Computer Systems, Inc. and its five semiconductor partners today introduced the R4000™, the industry's first true 64-bit microprocessor. This third-generation, single-chip microprocessor runs at 50 MHz and is offered with three packaging options to provide customers with a choice of price and performance levels. Pricing and availability of the R4000 will be announced today by Integrated Device Technology, Inc., LSI Logic Corp., NEC Electronics, Inc., Performance Semiconductor Corp., and Siemens Components, Inc.

At the launch activities in San Francisco, three R4000-based demonstrations were shown. They included early versions of the two operating systems specified by the Advanced Computing Environment (ACE) initiative — Microsoft Corporation's Windows™ NT and The Santa Cruz Operation's SCO® Open Desktop® — and RISC/os™, MIPS' implementation of the UNIX® operating system. Today's system software demonstrations marked the first time Microsoft or SCO has publicly shown their ACE products on R4000-based systems, which are expected to be commercially available in mid-1992. The R4000 is the flagship component for Advanced RISC Computing (ARC) systems that will begin to appear next year.

"The R4000 is the highest performing, single-chip microprocessor available today, and as such, has already had a significant acceptance by our industry," said Robert C. Miller, MIPS chairman and chief executive officer. "To be competitive in open systems, customers must be provided with freedom of choice. Because of MIPS' semiconductor licensing arrangements, and the ACE initiative's drive to support industry standards, customers are no longer tied to a single vendor for components or systems. In addition, the tremendous power contained in the single chip R4000 will give customers innovative software and hardware choices they never dreamed possible."

The ACE initiative promotes a broadly supported, standards-based open computing environment for a new class of advanced computers. Key elements include support for two hardware platforms — MIPS and Intel microprocessors — and the operating systems from Microsoft and SCO. Nearly 200 systems, software and semiconductor companies have joined the ACE initiative to date.

Performance The 1.3 million transistor R4000 is driven by a 50 MHz clock, which is used internally to operate a 100 MHz superpipeline. Because the chip is designed for high clock rates, MIPS plans to scale performance to higher clock rates in the future.

The R4000 is offered in three versions tailored for multiple price/performance points:

- R4000PC, which supports primary on-chip cache, is a 179-pin PGA (pin grid array) package targeted for the low-cost desktop, low-end server and embedded control markets.
- R4000SC, with secondary cache for uniprocessing applications, is offered in 447-pin PGA or LGA (land grid array) packages. It is intended for high-performance desktops and servers.
- R4000MC, with multiprocessing features and secondary cache, is available in a 447-pin PGA or LGA package.

Based on simulations of the SPEC benchmark suite, R4000 performance ranges from 40 SPECmarks for the R4000PC to 60 SPECmarks for the R4000SC and R4000MC. The simulation results are based on the use of development tools and compilers provided by MIPS. Performance results can vary based on the range of possible system configurations, from low-cost desktop to high-performance multiprocessing products. Comparable SPECmark performance today has been achieved only from competitors' implementations that range from five to nine chips, rather than a single chip.

The R4000 design has been optimized for integer performance, while providing excellent floating point performance. The result will be a broad range of systems that are well suited to both technical and commercial applications. Simulations of the SPEC benchmark suite on the R4000PC yield integer performance of 40 SPECint, while floating point performance is roughly 10 percent higher. Integer performance for the R4000SC and R4000MC is 55 simulated SPECint, while floating point results yield over 65 simulated SPECfp.

The R4000 integrates all necessary CPU components onto a single chip, including the 64-bit integer processor, 64-bit floating point coprocessor, memory management unit, 8 kilobyte instruction cache, and 8 kilobyte data cache, control and management facilities for primary and secondary cache, and full multiprocessing capabilities.

Transition from 32- to 64-Bit Computing Historically, the transition from 8- to 16-bit computing, then 16- to 32-bit computing has caused difficulty for microprocessor, software and system designers. With today's most advanced systems and applications fast approaching the maximum address capability of 32-bit devices, and mainstream applications expected to exceed this level by mid-decade, MIPS has incorporated 64-bit capabilities into the R4000 to ease the next transition.

The key benefit of 64-bit processing is to simplify a computer's ability to address large amounts of information — a feature that will greatly ease software programming and accelerate development of increasingly complex applications.

As the first true 64-bit microprocessor, the R4000 offers 64-bit characteristics across the board: 64-bit general-purpose registers, 64-bit operations, 64-bit virtual addresses for memory management, and 32 double precision floating point registers. This 64-bit capability has been achieved while maintaining full binary capability with existing 32-bit applications.

Ease of Design The R4000 includes configurable options in the secondary cache and system interfaces so board designers can build low-cost systems today, yet take advantage of frequency increases in the future. For example, a system designed for a 50 MHz R4000 can be upgraded to use future, higher frequency R4000 microprocessors without board modification.

Multiple Pin-Compatible Suppliers The R4000 is being manufactured by five semiconductor companies worldwide, each of which manufacture and market functionally identical, pin-compatible microprocessors. This is intended to assure multiple sources of supply in high volume at competitive prices.

As with previous generations of its microprocessors, MIPS provides a single design to the semiconductor partners, which is optimized for their respective process technologies. When components are available, MIPS tests and certifies the resulting product from each partner. In addition, each company has the right to design derivative products that serve a variety of market needs. These global sources have provided customers with a wide variety of MIPS RISC microprocessor solutions since 1989.

For more information:
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R4000 is a trademark of MIPS Computer Systems, Inc. Windows NT is a trademark and Microsoft is a registered trademark of Microsoft Corp. SCO and Open Desktop are registered trademarks of The Santa Cruz Operation, Inc. UNIX is a registered trademark of UNIX Systems Laboratories, Inc.

Semiconductor Partners' Quotes in Support of the R4000 Introduction

"IDT looks forward to developing a new family of processors based on the R4000 architecture, much like we did with the R3000. These new derivative products will further expand the price-performance range for the R4000, and allow us to target specific applications. IDT introduced several R3000 derivatives that allowed embedded systems to be designed at a low cost, using MIPS R3000 software-compatible processors, such as IDT's R3001™ or R3051™ with integrated cache. The R4000 will become the next standard platform from which IDT will offer the user an exciting migration path."

John Payne, President, Integrated Device Technology, Inc.

"The R4000 is the first microprocessor offering multiprocessing capabilities for the general-purpose computing marketplace. This third-generation MIPS RISC microprocessor will enable systems designers to gain higher performance from single-chip desktop solutions through multiprocessing solutions more easily and quickly than ever before. LSI Logic will support such applications with processors, chipsets and high-end ASICs."

Wilfred J. Corrigan, Chairman and Chief Executive Officer, LSI Logic Corporation

"The R4000 architecture represents a revolution in the microprocessor arena. This microprocessor has combined all the necessary functions onto a single die enabling users to build low-end PCs to high-end multiprocessing systems. Our technology will run at the performance required by our customers. Because it is available from multiple vendors, it gives freedom of choice to the end user. The combination of these factors will make this CPU the de facto standard for advanced computing of the nineties."

Dr. Hajime Sasaki, Senior Vice President, NEC Corporation

"Performance Semiconductor believes the R4000 with its three package configurations will cover the broadest spectrum of applications for any microprocessor — from low-cost desktop machines to supercomputers. The R4000 PC will give an unparalleled fixed and floating point performance combination at a very modest cost. We anticipate that the R4000SC and R4000MC with their secondary cache support for uniprocessor and multiprocessor applications, respectively, will gain a very large share of the desktop workstation, desktop server, and parallel processing market in the near term, and become the dominant microprocessor technology in the '90s."

Thomas A. Longo, President and Chief Executive Officer, Performance Semiconductor Corporation

"The true 64-bit R4000 microprocessor offers extended resources for a new generation of applications to handle high-quality image, video information and large databases. With the availability of the new single-chip R4000, applications benefitting from 64-bit flat addressing and 64-bit integer operations can operate next to 32-bit programs that run on earlier 32-bit R3000 processors."

Dr. Karl Heinz Annecke, Senior Director, Microprocessor Components, Siemens Semiconductor Group

TUUG Business Meeting Minutes

IBM Canada Ltd.
TD Tower, 9th floor - 201 Portage Ave.
Tuesday, October 8, 1991

Business meeting: Eric Carsted was absent. Gilbert Detillieux chaired meeting.

A) End of Season: This was the last meeting of the season.

B) Membership Secretary's Report: Total membership now exceeds forty. Membership renewals are due, price is $20 for the year.

C) Newsletter Report: Susan Zuk was out of town. Gilbert Detillieux, the new newsletter editor by acclamation, appealed to members to contribute items for the newsletter.

D) Treasurer's Report: Previous year's financial statement not yet available. Expected to have several hundred dollar surplus.

E) Meeting Coordinator's Report: Noted that meeting had been held in various locations with a good variety of topics.

F) Elections: (held by show of hands) — correction: Roland Schneider running for Secretary, not Meeting Coordinator *(ed: additional correction: Allan Moulding running for Membership Secretary as well)*

New Executive:
President — Susan Zuk (by acclamation)
Vice President — Richard Kwiatkowski (by acclamation)
Treasurer — Rick Horocholyn (by acclamation)
Secretary — Roland Schneider (by acclamation)
Newsletter Editor — Gilbert Detillieux (by acclamation)
Membership Secretary — Allan Moulding
Meeting Coordinator — Eric Carsted

New executive will take over at next executive meeting.

G) New Business
Question about progress of a Unix BBS system. No conclusion has been reached yet. There was some discussion about "bison," a PC uucp to internet link operating in Winnipeg. Suggestion to wait until after the Unix symposium because it may generate funds which can be put towards this project.

PRESENTED TOPIC
Bary Finch: NFS — Network File System

Agenda

for
Tuesday, November 12, 1991, 7:30pm
XCAN Grain Ltd.
TD Tower, 1200 - 201 Portage Avenue

1. Round Table 7:30

2. Business Meeting 8:00
   a) President's Report
   b) Membership Secretary's Report
   c) Newsletter Editor's Report
   d) Treasurer's Report
   e) Meeting Coordinator's Report
   f) New Business

3. Break 8:40

5. Presented Topic 8:50
   Unify Database & Accell 4GL
   Eric Carsted, XCAN Grain Ltd.

6. Adjourn 9:30

Note: Please try to arrive at the meeting between 7:15 and 7:30 pm. Thank You.

Next Month

Meeting:
The December meeting has traditionally been an informal wine and cheese party. This year, we are invited to a Casino Night, being held by CIPS, at the Rorie Street Marble Club on December 10th, from 6:00 PM to 9:00 PM. Cost is $15, and includes a hot buffet dinner, and a chance to win fun prizes! Tickets will be available at the symposium, at the November TUUG meeting, or by contacting Susan Zuk at 788-7312. Friends, spouses, and dates are welcome to attend.

Newsletter:
A report on the symposium — Please submit any related material (we need someone to act as a reporter for this). Christmas-related material too, please.