Status
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OF THE WESTERN AUSTRALIAN REGIONAL COMPUTING CENTRE
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Modelling's key role in Kwinana LPG project

Financial modelling played an indispensable part in the decision by Wesfarmers Limited to construct the $105 million LPG plant due to be completed at Kwinana in the near future, a Perth conference was told this month.

A specialised project model, created on the Decision Support System software, was used to structure a very complex gas pricing formula which satisfied the requirements of the SEC of WA on the one hand and Wesfarmers on the other, said Mr Mike Chaney, General Manager, Finance and Administration, at Wesfarmers.

Mr Chaney was one of the key speakers at the DSS conference organised by the WA Regional Computing Centre, developer of the DSS corporate modelling package. Financial modellers from Western Australia and interstate reported on their experiences with some of the decision-support system packages now available.

"There is no doubt in my mind that the sophistication of our DSS models gave us the edge to win the mandate for the Kwinana LPG project from several larger companies in the first place, and to find a way of structuring the project to make it viable," Mr Chaney said.

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Mike Chaney . . . "management convinced on modelling".

INSIDE STATUS

Director's Desk . . .

The 1987 year, highlights of which are summarised below, reflected the fast-changing industry in which we have been privileged to play a leading role in Western Australia for the past 25 years. It was a year of new directions and growth, tempered by some disappointments.

Work begun in 1987 to improve planning and forecasting will continue in 1988. There is a wide range of possibilities for a centre such as WARCC as information technology assumes an ever-widening role in helping to meet the demands of the University and other clients in education, industry and business.

Among these wider roles could be co-ordination (for example, negotiating site licences and bulk purchases, managing networks, integrating data and voice technologies), standardisation (such as formulating and promulgating policy on software piracy), specialisation (offering unique expertise or services which users would not normally be able to justify), and planning (helping users draw up information technology plans).

The challenge is to remain relevant and innovative, to anticipate needs, and to ensure that everything offered is cost-effective and service-oriented.

For the 15th successive year the range of services offered by WARCC, and the numbers of recipients of those services, has increased. In revenue terms the growth was more than 11 per cent.

This growth was by no means

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uniform, and we had to grapple with some difficult issues during the year. However this did not detract from the magnitude and value of the wide range of services rendered to The University of Western Australia, Murdoch University, the WA College of Advanced Education, numerous State Government departments, business, industry and individuals.

The non-profit nature of WARCC's operation was brought home forcibly during the year, as the surplus made in 1986 was all eroded, emphasising the need to contain costs and develop new business.

Revenue from computer processing fell by 7 per cent, continuing the trend of recent years. Processing represented less than 19 per cent of WARCC's total revenue in 1987. On the other hand, microcomputer sales, support and rentals exceeded 34 per cent of revenue and grew by 31 per cent. The expertise built up over the years in running and looking after large computers has been redeployed to look after other people's computers - thus Facilities Management activity amounted to 30 per cent of WARCC's revenue in 1987.

WARCC's capabilities in facilities management were further extended during 1987. A major project was the housing and operation of the AWA Sequel computer to run URICA for the libraries of UWA and WACAE.

For its off-campus users, WARCC has continued to offer a unique blend of expertise, cost-effective computing services and technology transfer. Its competitive advantage has been gained by economies of scale and by sound and creative management - and not by any cost advantage available to it as part of The University of Western Australia. WARCC pays for all services and facilities it receives from the University.

The most significant event for the Centre in 1987 was the introduction of WA CYBERNET Services, based on the newly installed Cyber 840A computer. This consists of a number of engineering packages in support of engineering projects critical to the development of the State's resources.

This venture got off to a slow start in 1987, mainly due to the generally low level of engineering activity in the State, and this had an adverse effect on WARCC's 1987 financial performance. However, this is expected to change soon as many large projects commence.

Contract programming and consulting activity continued its steady rise.

Dynamic growth continued in the Microcomputer Support area. Through an arrangement with the WACAE, the Centre can now offer IBM PS/2 computers to the university market, in addition to Apple Macintosh and IBM-compatibles.

The biggest addition to the services offered through the group came at the end of the year, when an agency for Sun Microsystems products was established. This agency extends to all higher education in WA.

Rounding off the WARCC portfolio of services are the facilities available through Microcompter Support to support the fast-growing demand for desktop publishing. To the micros, software, laser printers and scanner already available, WARCC added a Linotronic 300 Laser Typesetter capable of creating camera-ready bromides at up to 2540 dots per inch resolution. ❑❑

Alex Reid
Director

Directions for 1988

Micro Support

- A steadily increasing focus on support for "personal computing".
- More direct help to users, by means of visits, and by drawing up information technology plans for use of micros.
- An increased focus on value-added services.

Consolidation of mainframes

- The range of mainframes offered by WARCC will be reduced, so that support efforts can be consolidated and better focussed.
- The Prime will be phased out, and its workload and specialised services transferred to the VAX. The Prime is not seen to be within the mainstream of computers now necessary at WARCC.
- The DEC10 will be phased out towards the end of 1988. Users will be approached to explore the most appropriate alternatives.
- In due course, access to IBM and also to supercomputer capabilities is envisaged.

Charging and funding

- New and more appropriate ways to finance some of WARCC's services will be sought.

Promotion

- It is clear that many people, even traditional users of WARCC, are not aware of the range of services we offer. Accordingly, effort will be put into wider promotion of the Centre's services in 1988, primarily among its traditional marketplace - education and government.

Even before his wife leaves to teach at the Tammin Primary School, WARCC programmer Ralph Goodwin, right, may have solved a complex software problem on the Centre's DEC10 and be out tending his acre of ground.

Austpac helps Ralph enjoy country life

Computer programmer Ralph Goodwin enjoys the country life at Tammin, 175kms from Perth on the Great Eastern Highway - and at the same time provides WARCC with an almost instantaneous DEC10 problem-solving service.

Thanks to Telecom's new Austpac network his response times to software problems on the DEC 10 can now be quicker than when he lived at South Perth.

Ralph, a UWA computing science course honours graduate in 1982, joined WARCC in 1983 as a programmer specialising in the Centre's DEC10 and VAX mainframe systems. Following his marriage in 1987 to Bronwyn Smith, a Tammin Primary School teacher, the couple decided that the country life was best.

"The decision to resign from WARCC and return to the country was a very big one," said Ralph, a country boy himself, whose mother spent many years running the Post Office at Westonia, midway between Perth and Kalgoorlie.

"An enormous amount of effort goes into training programmers, especially in the systems area. A limited number of people had been diverted to the DEC10, and there was only one other WARCC person with specialist training on the VAX."

Outside users may access WARCC facilities in the following ways -

- **Austpac**
- **User work areas on the campus of The University of Western Australia**
- **Leased line from Telecom**
- **Dial-in modem**
- **Remote multiplexor (Royal Perth Hospital and QEll Medical Centre).**

Information on networking and data communications is available from Phil Dufty, Manager, WARCC Technical Services (phone 380 2612).

Finally WARCC Assistant Director Kevin Collins solved the problem with the suggestion that Ralph work remotely via Telecom's Austpac packet switched data network.

He has now established himself on a rental farm property, 40 kilometres from Tammin, with equipment comprising an Amiga micro, an IBM-compatible PC and a modem running at 2400 baud.

"I have started my own company, Microware, through which I liaise with WARCC and a number of other UWA departments. I have also started another company, Farmways, to promote to farmers usable new technology, such as rural computing and accounting systems."

Ralph said that after some initial problems, the Austpac link was now proving extremely reliable. Access is through one of the two phone lines which link his home to the local exchange. His terminal emulation program, running on the Amiga, automatically calls Austpac and then links direct to the DEC10 at WARCC.

Problems with the the Centre's DEC10 are usually related to software, and can be communicated almost simultaneously to Tammin for Ralph's attention. "Certainly a far quicker response time than in the days when I might have been called on to make an emergency trip to WARCC from my former home in South Perth," Ralph says.

So it may be that even before Bronwyn Goodwin departs for Tammin Primary School each morning her husband will have already solved a complex software problem on the DEC10, leaving him time to care for an acre of ground.

Each Monday he makes the two-hour drive to Perth to attend WARCC management meetings, to find out developments in other systems, and to hear comments from DEC10 users.

While the gradual phase-out of the DEC10 will reduce his involvement in this area of WARCC's operations he is confident that growing use of the VAX plus his Farmway operation will take up spare time and give him the means to stay in Tammin. ❑❑

Sun 'front-end' for UWA supercomputer

The dual-processor Culler C7 recently installed by the Centre for Water Research brings the age of the mini-supercomputer to The University of Western Australia.

Dr John Patterson, head of Limnological Modelling at the Centre, said the C7 was an interim machine before the installation of a fully configured version later this year.

In its present form the C7 has 40mb of memory, and each of its processors runs at 10 times the speed of a typical mainframe. This performance of four megaflops per processor will easily outpace the most powerful of the present generation of mainframes. The fully configured version will run at 10 times the speed of the present C7.

The Culler is designed for scientific applications and will boost the research efforts of the Centre for Water Research in field work, laboratory investigations and computational fluid dynamics. It has been funded from research funds and a University equipment grant.

Dr Patterson said Water Research staff looked at six or seven supercomputers before deciding on the Culler. "It was the most promising machine, with the future modifications being the big sweetener."

The C7 uses a Sun 3/180 as its front-end. The Sun chassis is mounted in the Culler's rack and the CPU is coupled to the supercomputer's CPUs via a high-speed interface.

The Sun provides a complete operating environment for the supercomputer, including all disk, terminal and ethernet input/output, using Sun's UNIX operating system (SunOS), which then leaves the supercomputer to do the number crunching.
Bob Schrader, WA Manager for Sun Microsystems Australia Pty Ltd, said that less than one year ago there were only three Suns on the UWA campus. Now there were nearly 30. ❑❑

Research Fellow Steve Armfield works on a Sun console, with the Culler C7 in the background.

Sense of challenge takes Carole to senior job

Carole Herriman's appointment as Assistant Director at the Computing Centre is just one more challenge in a 12-year career in a fast-changing organisation.

"WARCC has been a great place to come to understand the variety of tasks and services that make up a modern computing environment," she said this week. "Mainframes, micros, applications programming, data communications, networking - it is this tremendous breadth that provides career satisfaction and challenge."

Carole, formerly Services Manager, now has responsibility for Facilities Management, Operations and WA CYBERNET Services.

"With Facilities Management and CYBERNET my aim will be to continue to give the best and the most cost-effective service possible.

"CYBERNET, a package of sophisticated software for use in engineering, construction, mining and exploration, offers local firms the potential to minimise their capital use. By making use of our large-scale computing power and software base they pay only for what they need."

Carole said the bureau service for the

Carole Herriman

powerful PDMS (Plant Design Management System) software would prove to be a particularly attractive option for the construction, oil and gas industries.

"The WA Health Department is our biggest Facilities Management customer. But we have others, and for all we provide a range of services includ-

WARCC workshops aim for better software

Quality assurance and software engineering techniques are being discussed at open workshops held by WARCC at The University of Western Australia.

The first of the one-day workshops was run by the Centre's Applications Software Development Group on 23 June. Further workshops will be held on 5 July and 21 July. They are being presented by Terry Woodings, who has more than 20 years programming experience, the last nine as Applications Manager at WARCC. As WA Secretary of the Australian Computer Society, he is active in the promotion of professional development programmes.

The workshops are modelled on the one-day internal sessions held by the Applications Group every six months to discuss methodologies and quality-assurance techniques.

"Quality assurance and software engineering techniques are needed to improve the generally poor record of the industry," Terry said. "Systems should meet user requirements, on time and within budget."

Topics being discussed include: planning and project control techniques; lifecycle, prototyping and incremental methodologies; top down versus bottom up methods; Software Standards (DR 87176); software metrics; time and resources estimation; validation and verification; documentation versus on-line help; specification and code audits; test strategies; statistical reliability assessment; improving the user interface; portability and conversions; structured walkthroughs; milestones and acceptance criteria; change and configuration control; system maintenance; quality characteristics and measurement.

The above topics are independent of particular computer manufacturers or products and are relevant to third, fourth or fifth generation systems on either mainframes or micros. The workshops will be based on consideration of general principles followed by discussion of practical examples and case studies with the emphasis on small projects of up to five man-years.

Anyone engaged in the management or production of computer software should be aware of the uses of the above tools, Terry said. He guaranteed attendees a thought-provoking day.

The price of $165 a person includes a smorgasbord lunch, morning and afternoon tea, and a set of notes. Numbers are limited to 20 per day.

Inquiries: Terry Woodings 380 2618. Enrolments: Nicola Blackburn 380 2611. ❑❑

ing operations support and floor space for their computers.

"WARCC is always seeking new clients in this area, and is well-placed to offer new services and to acquire new facilities."

Carole began a career in programming in 1966 with IBM in Victoria.

In 1967 she began a seven-year stint in North America, mainly at the University of British Columbia and Cornell University, as a consultant/programmer.

In 1975, after the birth of her third child, Carole became training officer at WARCC. Except for one year, 1981, when she toured Europe and America on leave of absence, she has been at the Centre ever since.

Carole finds WARCC "still a very dynamic organisation, able to cope with change - not rigid, but adaptable". ❑❑

Campaign against piracy

University computing centre directors plan to take steps to correct what they believe is a perception among software vendors that software piracy is rife on campuses.

This problem, facing all universities at present, has two major consequences, according to WARCC Director Alex Reid.

"Vendors are reluctant to negotiate better terms for site licences and other measures to reduce the unit cost of software for teaching, when they think they are already being 'ripped off'.

"Vendors may well also be looking to 'make an example' of one university to deter all, in a similar fashion to photocopier abuse a few years ago, which resulted in general-access photocopiers being banned for a time from one Eastern States campus."

Mr Reid said one approach now being considered by universities was the preparation of a unified policy on software copyright and piracy, and a public statement condemning piracy.

A sub-group of the Australian University Computing Directors Committee had been formed to prepare a suitable draft statement.

Mr Reid said one answer to the problem of the cost of micro software for teaching purposes was to negotiate suitable "site licences".

This would mean that for one fee, as many copies as required could be made for use in the one organisation or location. However, little success had been achieved so far in the bid for site licences. ❑❑

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"In particular, our financial models helped us to devise suitable financial structures and an innovative gas pricing formula that helped the project to proceed."

Mr Chaney said good software was the key to successful modelling, whether at the corporate or operating level.

He said the role of Wesfarmers' corporate head office was similar to that of an investment bank. It co-ordinated the provision of finance, legal and other specialised services such as investment advice, made decisions on the disposal of operations that did not meet group objectives, and looked further afield for new investment opportunities.

The Corporate Division's modelling activities fell into five main areas: budget preparation, performance reporting, a corporate financial model, a project evaluation model, and specialised applications for one-off evaluations. Together they played a very important role in most corporate activities.

"The single most important feature of a modelling system which can cater for all these applications is flexibility. It needs to be able to offer the facilities required by both the inexperienced user, who wishes to learn the system quickly, or the more experienced user who wants to look at projects in great detail.

"The system's final output must be easy to read. It must be able to handle complex corporate structures. Very importantly, it needs to be able to handle the rapid changes that occur in business."

Mr Chaney said the factors which led to the success of the corporate modelling activity were an important issue.

"Over the past few years there has been growing concern about the pitfalls of financial modelling, and several published examples where the use of modelling techniques resulted in major corporate blunders, and in some cases dismissals.

"There are five key success factors for successful corporate modelling: it must satisfy a need; it has to be run by good people; the interplay between modelling, decision-making and management has to be carefully monitored and controlled; models should be fully integrated; and the right modelling software must be used.

"The reason modelling has become such an indispensable part of the corporate activities of Wesfarmers is that it has proved so successful in some of our early applications, allowing the company first to win mandates from the Government against other major contenders, and ultimately to devise ways of structuring the projects so that they were feasible.

"It was subsequently recognised by all those involved from the Chief Executive to the operating managers that without such good models some of the projects in question may never have got off the ground. The LPG plant is a notable example."

Mr Chaney said modelling at Wesfarmers had a champion - a highly skilled person at senior level.

"It's a critical requirement that the person in charge of modelling has sufficient knowledge and experience to use models effectively."

The handling of the decision-making and modelling role was equally important.

"While the person accountable for modelling should be a manager with an appreciation of wider issues, his own managers shouldn't abdicate their decision-making role to the modeller. On the one hand this is tempting, because in developing complex models, the modeller often gains the superior understanding of many of the issues. But on the other hand it is dangerous because the model builder may not see the wood for the trees."

It was essential that financial models be fully integrated.

"If you are building a model starting with physical flows, like a mine plan, and developing it into a profit and loss statement, you have got to take the extra steps to complete it with a cash flow and balance sheet model.

"It surprises me how many people with accounting backgrounds, who have been brought up on double-entry accounting and have lived with it all their life, will still build models on a single-entry basis. The fact is that in modelling one makes errors and unless you've got some inbuilt way of checking them you're going to have problems.

"At Wesfarmers the existence of a standard integrated model ensures that the risk of these problems is minimised. The models all balance and if you put something into one part it all flows through."

Mr Chaney said that choosing the right software from the great variety available was perhaps the most important factor in the success of modelling.

"As a manager, the worrying thing about financial modelling is that the output which is produced looks so convincing - even if it's wrong. Over the years that I have been exposed to modelling, the serious mistakes which I have seen were made in spreadsheet models.

"To my mind there is a big difference between spreadsheet-based packages and language-based packages such as DSS. Any serious corporate modelling activity must be based on a language-based package." ❑❑

Desktop system faces UWA Handbooks test

To be word-perfect is probably an impossible goal for a publications officer, but Allan Watson may be just a little closer since the installation of a desktop publishing system in the publications section at The University of Western Australia.

The real test will come with the publication next year of the total of more than 1000 pages in the 11 volumes of the UWA Faculty Handbooks.

"What's ahead is the first 'normal' year after the time, cost and frantic effort involved in getting the 1988 handbooks keyed into the system," Allan says. "I am very glad that for next year - a time of heavy change on the campus with the introduction of the semester system - we will have everything in-house."

Allan is at present scouring a bound volume of this year's handbooks, picking up any typographical errors that occurred during the re-keying process.

"Our work has to be good," he explains. "The publications we produce must reflect the very high standards set by this University."

Allan, Publications Officer on the UWA campus for the past 22 years, and before that an "amateur" editor while working in the book trade, has two assistants in the editorial area.

Publications hardware includes a Mac II with 40mb of hard disk space, plus a Mac SE, with 20mb. This is used with Pagemaker 2.0 desktop publishing software and MicroSoft Word for the generation of text.

Proof copies and publications where quality of reproduction is not paramount are produced on a laser printer. High-resolution camera-ready artwork is printed on the Linotronic 300 Laser Typesetter at the WA Regional Computing Centre.

As well as the handbooks, the desktop system produces the University's Annual Report, the bi-monthly Uniview magazine, the monthly Research News, publications for prospective students, booklets, brochures, forms, and a host of "bits and pieces".

Allan says it is hard to pinpoint detailed cost savings at this stage, but one of the immediate benefits of the system has been the release of a full-time publications person from IBM Composer typesetting work. Drafts now come to the Publications Section in the form of Macintosh word processor files, and no longer need to be rekeyed into the Composer.

"From the time when we liaised with typesetters we have now moved to the situation where we have control over the production of our publications. Now we can simultaneously lay out, say, a magazine page on the screen and edit the text. If a story is too long, we might make a picture smaller, or cut the text, or a bit of both. It can all be done there and then and a proof from the laser printer will confirm that it looks okay.

"The glory of the system is its ability to produce these page proofs quickly and cheaply."

Allan says the Macintosh and Pagemaker are proving to be "very, very effective".

Big pluses are the ability of the system to insert accurately symbols in foreign language typesetting, and the access to subscript and superscript.

Another plus is the ease of access to graphic images scanned on equipment in the Computing Centre's Micro Support area and stored on disk for use as required.

The system is not without its faults, however. The lack of non-decimal fractions and the absence of a true minus symbol are niggling drawbacks. And the page make-up software also has imperfections, although improvements are being made all the time.

"The Linotronic generates a totally clean, made-up piece of artwork," Allan says. "Previously it was pasted up, often with bits and pieces stuck on at the last moment and with keylines put in by hand." ❑❑

UWA Publications Officer Allan Watson . . . desktop system a big plus.

Atoms study devours computing power

Study of the molecules and atoms that make up the core substances of our universe can devour awesome amounts of computer time.

This is the reality of working life for Dr Graham Chandler, of the University of Western Australia's Chemistry Department, and for his colleagues in computational chemistry everywhere.

Computational chemistry, he explains, is the study of the electronic structure of molecules and of the distribution and energy of electrons. It places long and heavy demands on computer input and output facilities, with large volumes of numbers needing to be stored on peripheral devices, fed in, manipulated and returned throughout the computing procedures.

These procedures can determine among other things the geometric shape of molecules, their absorption of light and radiation, their behaviour in magnetic fields, and the detailed course of simple chemical reactions.

"In fact computational chemistry aims to summarise all the properties of the isolated molecules and atoms," Dr Chandler says.

He has had an intense interest in the link between computers and chemistry since the days of his PhD at Adelaide University and post-doctoral work in the United Kingdom. He is now one of a small group carrying out original research in computational chemistry in Australia.

Dr Chandler . . . "need for campus computing power".

He points out that the background theory needed to understand chemistry and the interaction and reaction of chemicals was understood in the 1930s. What has led to chemistry becoming a computer discipline is the immense complexity of turning this basic theory into numerical predictions.

"On the UWA campus the West Australian Regional Computing Centre has played an enormously important role in this area, particularly with the introduction in 1983 of Z-class computing. Weekends have seen us putting 20 hours and 36 hours of work into the WARCC mainframes at the lower charge rates offered to Z-class users."

Dr Chandler has just returned from nine months study leave at the IBM Research Centre at Almaden, San Jose, California, where he was able to work on the IBM 3090, the top-of-range product from the giant manufacturer.

"I looked at simpler molecules, but in more detail than is possible in Australia."

Dr Chandler said IBM research facilities were very exciting places.They added emphasis to his "continuing interest" in seeing a strong, well-equipped central computing facility on the UWA campus.

"Storage and speed is limiting the calculations we have been attempting. Work that is routine elsewhere in the world is pushing the edge of computers here.

"We can no longer compete on the leading edge of computational chemistry. To do so we need access to a supercomputer."

While his work has been purely conceptual, with little direct feed into practical applications, the broader area of computational chemistry is now becoming rather more useful.

The existence of new molecules in space had been predicted first by computational chemistry, he said.

The National Aeronautics and Space Agency in the United States had used computational chemistry in research into the construction of nose cones for rockets.

Drug companies were also actively using computational chemistry in the design of their products. ❑❑

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