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OS/2's Own!

The Development of the Component Test Group

by Tom Stratton

The Component Test (CT) Group has the task of writing programs that test the Presentation Manager's User and Graphics Engine components on the function level. In general, the test fall into 2 categories: the standalones that are predominantly written against the User code and the Random Test Generator (RTG) which is a massive program (the largest PM program to date) that tests the Graphics Engine.

The basic approach of both styles is that test code, written from the IBM specification, would predict and point out errors in the product's code and ambiguities in the user documentation. Beyond that, the goal was to automate the tests. We hoped to get away from user verification as much as possible by having the test code emulate what the PM function accomplishes and then compare results after the call. There were some cases where that was just not feasible due, in the case of the Graphics Engine, to the complex algorithms that render lines, fill areas, etc., and in the case of User, to the difficulty in tracing a moving rectangle when windows are dragged around the screen by the mouse. Then there are the color tests. In short, there remains some user verification in the tests.

In the early spring of 1987 the CT project was comprised of a small group of programmers whose initial task was to write function test designs called IT1's, which were then reviewed jointly by both IBM and MS. From these IT1's test code was written. This was at a time when much of the product

code was either not very firmly in place (subject to many revisions) or simply absent altogether. That meant that by summer of 1987, when more and more programmers were brought into the CT project, that one simply wrote tests from the IT1, compiled it and went on to the next. Function by function, this code was then linked into the skeleton of what was becoming the RTG.

By September last, with Genes Sydoriak at the helm, this once small group had built itself up to one of the largest groups in Systems. CT was made aware of IBM's statistical model of how many PTRs (bug reports) that should be found in our charge: approximately 400 in User and circa 600 in the Engine. Initially, CT scoffed at those numbers, thinking them too high. The RTG was basically limping along, self-conscious of its own troubles and not very convincing to us when it seemed to point to a function failure. At this point, the bad news was that the RTG couldn't run more than a few minutes without a GP. The good news being that the cause of the GP was either in the RTG or the product. The group was reticent to send off PTRs in the fear that they'd be classified as "user error" and therefore a waste of the developer's time in tracking down the alleged problem. We were in the bind of relying on code to test code and the RTG had no history of being reliable. Beyond that, the spec, which IBM controlled, was constantly changing due to DCRs (document change requests) and development was changing code under our feet before the DCRs had ever been committed to the product. The wishes of CT for an on-line spec with MS updating it faded. To make things worse, the communication between CT and "devo" was practically nonexistent. Development was under fire to get "code complete" and did not want to be disturbed and most of the CT programmers were new to MS and unfamiliar faces to the developers.

It was not until January 1988 or so that the RTG developed enough reliability that the PTRs finally started to pour out and the IBM model began to look like approachable reality. Early this spring CT began running the RTG over night without hitting a GP (general protection fault). The log file produced by the run would then point the programmers to the problems that would be looked into for the next day. The crunch was on in earnest with CT and developers working six and seven days a week eradicating the roaches. The two groups got introduced.

Currently, CT has all but exited Component Test with approximately 500 PTRs against User and 550 against the Engine. (There were a number of PTRs leveled at VIO/AVIO - the character based part of PM). The group has dramatically shrunk in size of late and with Gene Sydoriak's MS departure, two new CT leaders have emerged: Pat Tharp has taken the Manager's position with David Anderson as the Technical Lead.

Other members of the Component Test Group are Scott Leatham, Jonathan Manheim, Chris Comaford, John Colleran, Nancy Stavinga (on loan), Ben Ting, Bill Anderson, Jon Parati, and Dan Knierem.

THE OS/2 1.2 FILE SYSTEM GROUP

by Rajen Shah, Team Lead

The OS/2 file system group is large, and has a number of projects going on. I will only describe what the v1.2 group (aka the IFS group) is doing.

The 1.2 project started off in Fall 1987 as a small, very self-contained project to incorporate support in the kernel to allow the use of installable file systems (IFSs) which would make it possible to access media that had file systems different from the FAT based OS/2 file system.

There were several reasons for needing such support:

- Eventual extinction of the FAT based file system on large media
- Improving the performance of file access
- Moving on to a secure file system

The original design and development team consisted of five people from Microsoft and two from IBM who did most of their work in Redmond. The contents of the team, and various members' responsibilities have, changed over time. Also, as time goes on, the number of requirements have increased as new functionality or performance items gain in importance.

However, the original aspects of the project still provide the focus of the v1.2 development team. An added twist is that we have to be more concerned about the support for 386 version of the system, and need to ensure that the interfaces can handle 32-bits easily.

In the early stages of the project, it was perceived that there would be at most four phases:

- (1) Implement IFS support
- (2) Functionality requirements from IBM
- (3) Some 386 support
- (4) Microsoft's response to phase (2)

While this was all being sorted out and finalized, other important requirements came to light, in particular support for names longer than those that would fit into the current 8.3 naming format. The kernel would require some changes, but this would not affect the FAT based file system. It would be there for use by other IFSs that could use longer names, and it would also affect all the utilities that manipulated files or directories. Other requirements of the project were various enhancements that would significantly improve the performance of LANMAN.

The file system code in the kernel has mostly been inherited from PC-DOS, and so is very much

single-tasking code. At the time that it was written, there was a very strong requirement to use the minimum amount of space, and single tasking was the order of the day. In addition, there were many places where there were special “hooks” that are used by the REDIRector to gain access to kernel routines and data structures. Therefore, the file system that we inherited had a very convoluted structure and a lot of very “sleazy” code that was really hard to follow.

There is another aspect of the file system that is not very well understood by a lot of people who have never worked on it, and that is the compatibility issues. Many people complain how “bad” the file system code is, and how hard it is to follow it. Well, in the beginning there were FCBs; then came ASCIIZ strings; now we have APIs. All these have to be supported for backward compatibility, and an attempt is made to use common code as much as possible. However, FCB operations do not necessarily map one-to-one onto ASCIIZ operations, and so a lot of special-casing needs to be done.

Part of the v1.2 project was to clean up the file system code and to put in documentation so that it would be easier to maintain. We feel that we have done a good job of it, and are cleaning up the code more and more as we continue.

The fearless leader of the v1.2 project is Bryan Willman who is the chief architect. The rest of the file system part of the group is essentially divided into two sub-groups:

- The “kernel task force” consists of Peter Wu, Therese Stowell and myself. We are responsible for design and coding that is going into the kernel.
- The “long names task force” is responsible for upgrading all the system utilities to handle long names correctly. This will involve, generally, changes to data structures and to output to the screen. The team consists of Mark Hitch (team lead), Claus Cooper, Gilman Wong, Paul Edwards and Tim Wagner.

In addition to the technical parts of the project, the v1.2 group also has the distinction of being the “pilot project” in which various process-type issues were addressed, and various working methods tried out. This was an attempt to have a better structured approach in managing and carrying through projects to completion, without the usual unplanned long nights and long weekends at work that have plagued Microsoft projects before. Phase (1) was a real success in this attempt.

With IFS support, OS/2 will be ready to take on the world. We will be able to “change” the file system to take advantage of newer, larger media, and also take advantage of new hardware support. This will speed up file access in the system, and remove usability restrictions that currently exist (in terms of names), and will provide a means to a more secure file system in the near future.

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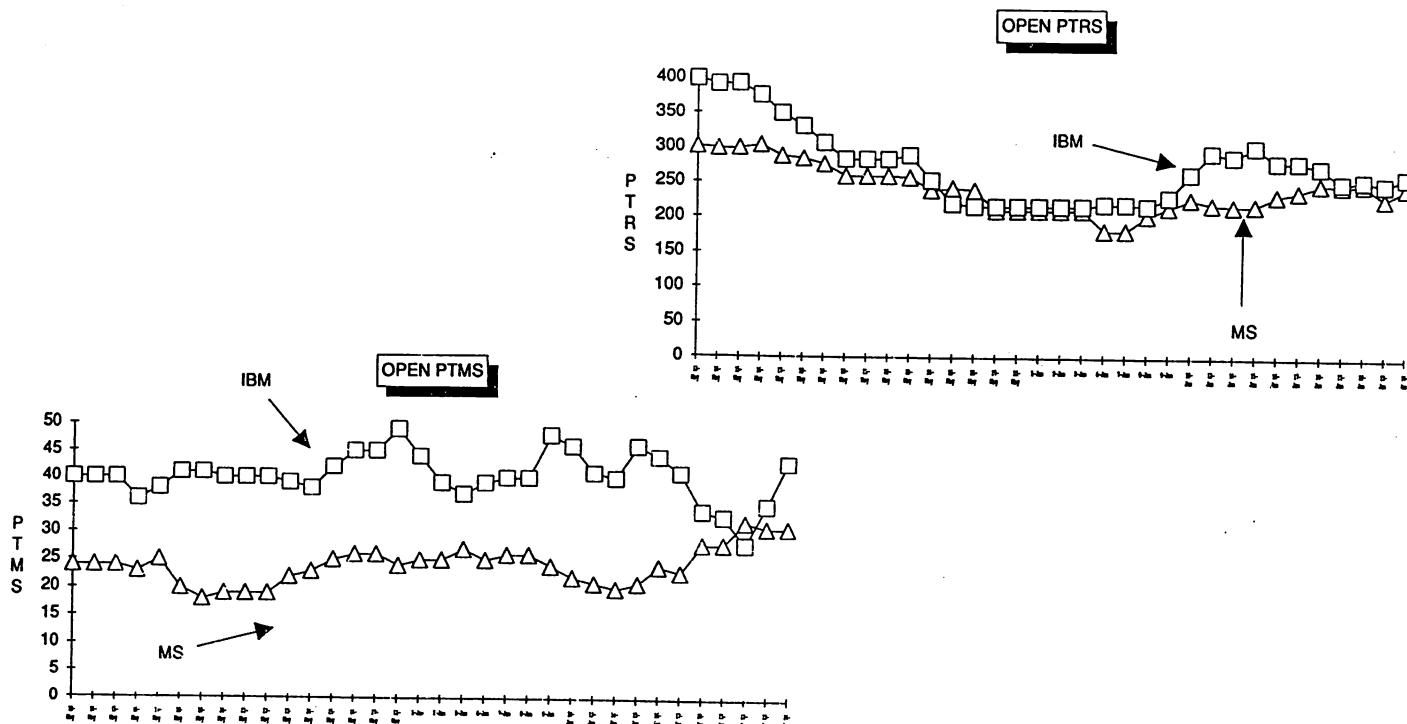
OS/2J

Kent Diamond is in town this week, and I had a chance to talk to him about OS/2J. Microsoft is working with about 7 OEM's to make OS/2J the standard operating system in Japan. The largest of these OEM's, by far, is NEC. Some of the others are Fujitsu, Hitachi, Toshiba, Mitsubishi, and Sanyo. The biggest challenge is that the hardware is very different -- each manufacturer makes a different machine. There is no standard. The second challenge is translating all of the files into Japanese. The hardware has to support the Japanese character set, which has double-byte characters. One of the 3 Japanese alphabets has 100,000 kanji (characters)! Only about 2500 of these are commonly used, but still the ROM has 10,000 defined character slots.

Kent gave me a demonstration on a NEC machine. It was really interesting to see the familiar OS/2 screen with Japanese characters. The user can toggle between typing English or Japanese. But any commands must be entered in English. One feature that they are still working on allows the user to type in English, and OS/2J will translate the input (phonetically) into Japanese.

Next week, Kent will be returning to Japan for another eight weeks. I'm sure he will enjoy himself even more. With a little more practice, he will be speaking Japanese as well as he speaks assembly. he will be speaking Japanese as well as he speaks assembly.

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SIGHTSEEING TOURS

Tours are offered that will literally let you cover Maui from head to foot; you can walk it, drive it, sail around it, fly over it, or see it from below the water. Almost every major hotel has a tour desk from which you can book. Plenty of booking agencies are along Lahaina's wharf: on Front St. in Lahaina try Tom Durkwood's Information Booth, the only free-standing sidewalk booth in Lahaina, or Visitor Info & Ticket Center in the Wharf Shopping Complex at 661-6151. Call Aloha Activity Center in Kaanapali and Lahaina at 667-9564; in Kihei a good general purpose activities booth is Activities Unlimited, just across the street from Kahe Beach Park on Kihei Rd., 879-3688. Ocean Activities Center in Kihei, tel. 879-4485, can also book you into a wide variety of activities. Others are found in Wailea, Kahului and Napili.

Land tours

It's easy to book tours to Maui's famous areas such as Lahaina, Hana, Kula, Iao Valley, and Haleakala. Normally, they're offered on half- or full-day schedules (Hana is always a full day) and range anywhere from \$17 to \$50 with hotel pickup included. Big bus tours are run by Grayline, tel. 877-5507, and Roberts, tel. 877-5038. These tours are quite antiseptic as you sit behind tinted glass in an a/c bus. You get more personalized tours in the smaller vans, such as Holo Holo Tours, tel. 661-4858. Among other destinations they'll take you to Hana with a continental breakfast for \$50. Personalized Small Group Tours, tel. 871-9551, goes to Hana for \$40, or to Haleakala for \$30. No Kai Oi Tours hits all the high spots and has competitive prices, tel. 871-9008; Trans Hawaii Maui specializes in all-day trips to Hana for \$40, bring your own lunch, tel. 877-7308. Maui Special Tours shows you the sights with an old Maui hand, Jack Groenewout. His personalized tours are enhanced by a storehouse of information about Maui, tel. 879-9844.

The Sugar Cane Train

This is the most popular tour on Maui. The old steam engine puffs along from Lahaina to Kaanapali, a 25-min. ride each way, and costs \$4.25 OW and \$6.50 RT adults, \$2 OW and \$3.25 RT children to age 12. A free bus shuttles between Lahaina Station and the waterfront. The train runs throughout the day from 9:35 a.m. to 4:10 p.m. It's very popular so book in advance. All rides are narrated and there may even be a singing conductor. All kinds of tours are offered as well: some feature lunch, a tour of Lahaina with admission to the Baldwin House and the Carriage Inn, and even a cruise on a glass-bottom boat. They're tame, touristy and fun. The price is right: the deluxe tour including RT train ride, lunch, Lahaina tour and an all-day Kaanapali trolley pass for \$15. Call the Lahaina Kaanapali and Pacific Railroad at tel. 661-0089.

Air tours

Maui is a spectacular sight from the air. Two small airlines and a handful of helicopter companies swoop over you around the island. These joy rides are literally the highlight of many people's experience on Maui, but they are expensive. The excursions vary, but expect to spend at least \$100 for a basic half-hour tour. The most spectacular ones take you into Haleakala crater, or perhaps to the remote West Maui mountains where inaccessible gorges lie at your feet. Other tours are civilized: expect a champagne brunch after you visit Hana. Still others take you to nearby Lanai or Molokai to view some of the world's most spectacular sea cliffs and remote beaches. Know, however, that many hikers and trekkers have a beef with the air tours: after they've spent hours, or maybe days, hiking into remote valleys in search of peace and quiet, out of the sky comes the mechanical whirr of a chopper.

The two airlines operating from Kahului Airport are Paragon Air at 244-3356, and Central Pacific Airlines at 242-7894. The helicopter companies include: Papillon Helicopters, flying from Pineapple Hill in Kapiolani, call 669-4894; Kenal Helicopter,

which leaves from Kaanapali at 661-4427; Awesome Maui Helicopter at 661-8889; Maui Helicopter Adventures, located at the Intercontinental Hotel in Wailea, tel. 879-1601. All tours are narrated over specially designed earphones, and all helicopter companies will make special arrangements to drop off and pick up campers in remote areas.

OCEAN TOURS

You haven't really seen Maui unless you've seen it from the sea. Tour boats operating out of Maui's harbors take you fishing, whale watching, dining, diving, and snorkeling. You can find boats that offer all of these, or just sail you around for pure pleasure. Many take day trips to "The Pineapple Island" Lanai, or to Molokai with a visit to Kalapapa Lagoon. Colony included. Many visit Molokini, a submerged volcano with only half the crater rim above water, that has been designated as a Marine Life Conservation District. The vast majority of Maui's pleasure boats are berthed in Lahaina Harbor and most have a booth right there on the wharf where you can sign up. Other boats come out of Maalea with a few companies based in Kihei. If you're interested in snorkeling, scuba, fishing, sailing, water or jet skiing, parasailing, sailboarding, or being captain on your own sailboat, see "Sports" section.

The boats

The following are general tour boats that offer a variety of cruises. *The Lin We* is a glass-bottom boat that's a facsimile of a Chinese junk. One of the tamiest and least expensive tours out of Lahaina Harbor, it departs six times a day from Slip #3 and charges \$9.50 adults and \$4.50 children. It gives you a tour just off Maui's shore and even goes for a whale watch in season. It's little more than a sea-going carnival ride. Call the *Lin We* at 661-3392, and remember that it's very popular. *The Coral Sea*, tel. 661-8600, is more of the same only it's a bit larger and offers a snorkel/picnic tour. For \$39 (children half price) it provides equipment, lunch and an open bar. It's in Slip #1, Lahaina Harbor.

Trilogy Excursions, tel. 661-4713, is operated by the Coon Family. They run two trimarans: the 50-foot *Trilogy* and the 40-foot *Kailana*, which carries up to 35 passengers to Lanai. For \$85 you get breakfast, then fish and snorkel on your way to Lanai. Once there you anchor in Manele Bay and after a tour of the island you come back to an excellent barbecue. An all-day affair, it provides a sampling of Maui's ocean activities.

Windjammer Cruises, tel. 667-8834, offers similar trips to Lanai aboard their 65-foot, three-masted schooner. They pack in over 100 passengers and on weekends feature a lunch at the Hotel Lanai in place of the barbecue. Seabird Cruises, tel. 661-3643, takes day trips to Lanai or Molokai for \$59. Over 100 passengers fit aboard their two 65-foot catamarans, *Alkane II* and *Ono Mane*. They also run the 65-foot *Viajero* that carries 35 passengers. They feature a Kalapapa Tour on Molokai. Seabird Cruises also offers a sunset cocktail sail for \$22 and a snorkel-and-dinner sail for \$32. Unicorn Tours, tel. 879-6333, takes 50 passengers on *Unicorn I* to Lanai or Molokai on half-day excursions or to both on full-day trips. Prices are \$36 to Lanai, \$56 to Molokai, and \$80 for both. Food and island tours are included. Captain Nemo's Emporium, tel. 661-6565, located on Front St., sails *Seasmoke*, a 58-foot catamaran (built for James Arness and reported to be the fastest "cat" on the island) to Lanai on a snorkel and diving run. They leave at 8:00 a.m. and return at 2:00 p.m. and serve breakfast and lunch for \$68.

These companies also have dinner sails, cocktail sails and whale watches for much cheaper prices, but they tend to pack them in so tight that they're known derisively as "cattle boats." Don't expect the personal attention you'd receive on smaller boats. However, all the boats going to Molokai or Lanai will take passengers for the OW trip. You won't participate in the snorkeling or the food, but the prices (negotiable) are considerably cheaper. This extra service is offered only if there's room. Talk to the individual captains.

Sunset cruises

These romantic cruises are very popular and are available from many boats. They last for about two hours and cost \$20-\$30 for the basic cruise. If cocktails or dinner is added the price goes up. Alhili Yacht Charters, tel. 661-3047, will sail you out of Lahaina at sunset on its teak and mahogany 40-foot yacht for \$25. They also trip to Lanai for \$62 and will take you snorkeling for \$40. Kaulana Cruises, tel. 667-2518, offers a dinner sail for \$32 and a cocktail sail for \$20 (children half price) on its 70-foot catamaran. They also sail a picnic/snorkel to Lanai. Scotch Mist, tel. 661-0366, has two racing yachts, *Scotch Mist I* and *II*. They are the oldest sailing charters on Maui (1970) and claim to be the fastest sailboats in the harbor: boasting the lightest boat, the biggest sail and the best crew. They'll cruise, snorkel (varying prices) or take their 19 passengers on a sunset sail complete with champagne for \$33 or \$25, depending on which boat.

Out of Kihei you might try the Maui Sailing Center, tel. 879-5935, which takes six passengers on its Cal 27 for a full-day snorkel sail to Molokini departing from Maalea harbor. From Wailea's Ulua Beach you can board the 65-foot *Wailea Kai* catamaran along with 90 others for a picnic/snorkel outing to Molokini. They also offer a popular dinner sail. Contact Ocean Activities Center, tel. 879-4485. From Kaanapali the Sea Sails makes an evening dinner sail from its anchorage at the Sheraton Beach. Contact Sea Sport Activities Center at 667-2759.

Whale watching

Anyone on Maui from Nov. to April gets the added treat of watching humpback whales as they frolic in their feeding grounds just off Lahaina, one of the world's major wintering areas for the humpback. Almost every boat in the harbor runs a special whale watch during this time of year. A highly educational whale watch is sponsored by the Pacific Whale Foundation, located in Kihei at Azeka Plaza, tel. 879-8530. A non-profit organization dedicated to the study and preservation of the whale, their extremely popular three-hour whale watch takes place only on Sundays aboard *Alkane II*, operated by Seabird Cruises, tel. 661-3643.

If you're at all interested in whales, visit Greenpeace at 628 Front St., Lahaina, tel. 667-2059. Here, Doug Duncan, the office manager, is full of enthusiasm and information about whales. Greenpeace has an educational video on whales, and can book you on a wide variety of whale watching cruises. It costs no more to book through Greenpeace, and part of your ticket price becomes a tax-deductible donation to the "Save The Whales" campaign.

Since Lahaina Harbor is an attraction in itself, just go there and stroll along to hand-pick your own boat. Many times the whale watch is combined with a snorkel and picnic sail so prices vary accordingly. Two of the cheapest are aboard the *Lin We* and the *Coral Sea*. Others include the *Mareva*, tel. 661-4522, berthed in Slip #63, a 38-foot sloop which will take you out for a half-day whale watch for \$30. *The Kamehameha* is a 15-foot catamaran for snorkeling or whale watching at \$17. This "cat" is in Slip #67, tel. 661-4522.

If Lahaina is too frenetic for your tastes, head for Kihei where you can get a boat out of Maalea. Try booking through The Dive Shop, tel. 879-5172. They might book you on the *Maui Diamond*, skippered by Capt. Dave Ventura, berthed in Maalea Harbor; you couldn't make a better choice of sporting boat. Book through the Dive Shop or through Capt. Dave directly, tel. 879-9119.

• ONLY MAIN HIGHWAYS SHOWN.
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FOR MORE ROAD AND SIGHT DETAILS.