

**The Future of IBM S/390 Mainframe
Small Platform Computing**

Session 9105
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Yesterdays new technology is today's legacy. Historically, 80% of all corporate computing was performed on IBM mainframe computers. The birth of these multiprocessing computer systems heralded in a new era for commercial data processing. The first System/360 products were slow by our standards today but encompassed the mentality of over-engineering to popularize IBM as business process automation king.

Thirty-six years later IBM retains the crown as the provider of choice for large scale computing within the Fortune 1000 crowd. Although IBM no longer retains the enterprise wide entrenchment on the desktop or within departmental computing that it previously enjoyed it is still a significant standards bearer for heavy-metal computing. The corporate wide dominance of IBM products may be dwindling as the encroachment by alternative technologies such as Microsoft-Intel or Sun-Linux continues but our reliance on the 99.999% reliability and legacy compatibility of the venerable mainframe remains constant. System 390 still processes the bulk of the world's financial transactions and commercially the Fortune 1000 corporations continue to implement heavy metal applications but the future dominance of mainframe systems, as we know them, may be in question as IBM attempts to reinvent the industry it created.

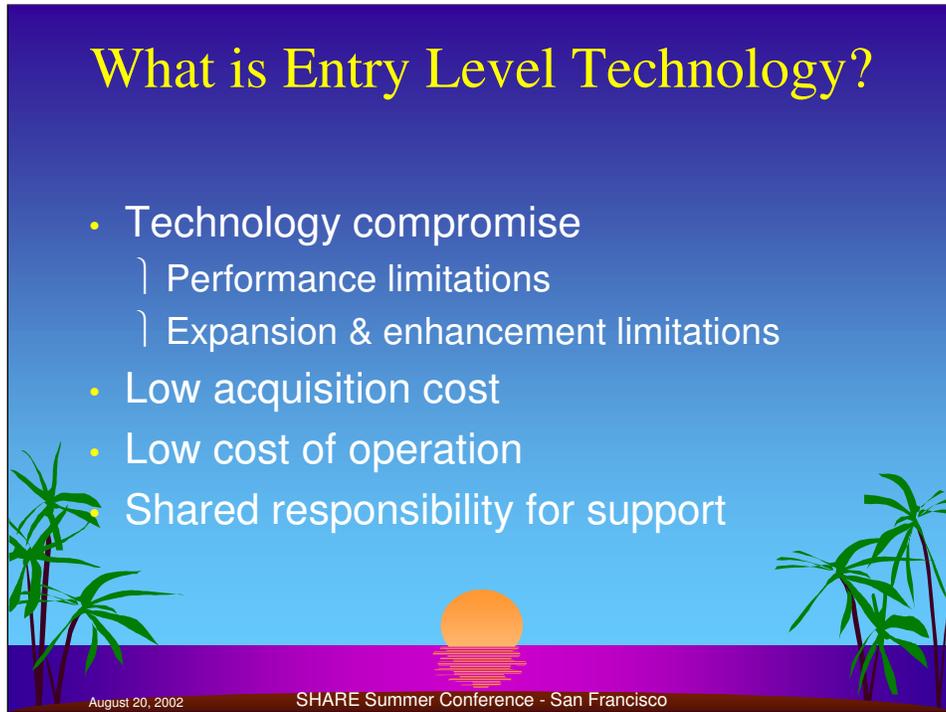
With the cost of manufacturing and business operations increasing while sales margins decline IBM has found itself caught between a rock and hard place. Over the last thirteen years it developed some fascinating adaptations of S/370 and S/390 technology and created a marketplace demand for System 390 while continuing to lower the entry cost so as to stimulate new applications, new uses and new users. But the times have changed and lower profit margins has caused IBM to rethink this market niche.

In the recent past entry level technology contained compromises for all involved. The customer compromised on performance while receiving legacy compatibility and a lower cost of acquisition in return. For IBM the compromise was on lower revenue while retaining customer loyalty, brand recognition, and encouraging new installations for potential future annuity revenue. But that was yesterday, and yesterday is gone.

IBM has made drastic organizational changes in an attempt to adapt to a rapidly changing and technologically challenging marketplace. These changes are having a significant affect on how IBM is handling the entry-level mainframe computing market. Recent events at IBM concerning entry level technology has created an emotionally charged atmosphere dividing the user community and raising questions as to the technical direction of the IBM System 390 division. If you rely on mainframe computing then these events could affect you.

What is Entry Level Technology?

- Technology compromise
 -) Performance limitations
 -) Expansion & enhancement limitations
- Low acquisition cost
- Low cost of operation
- Shared responsibility for support

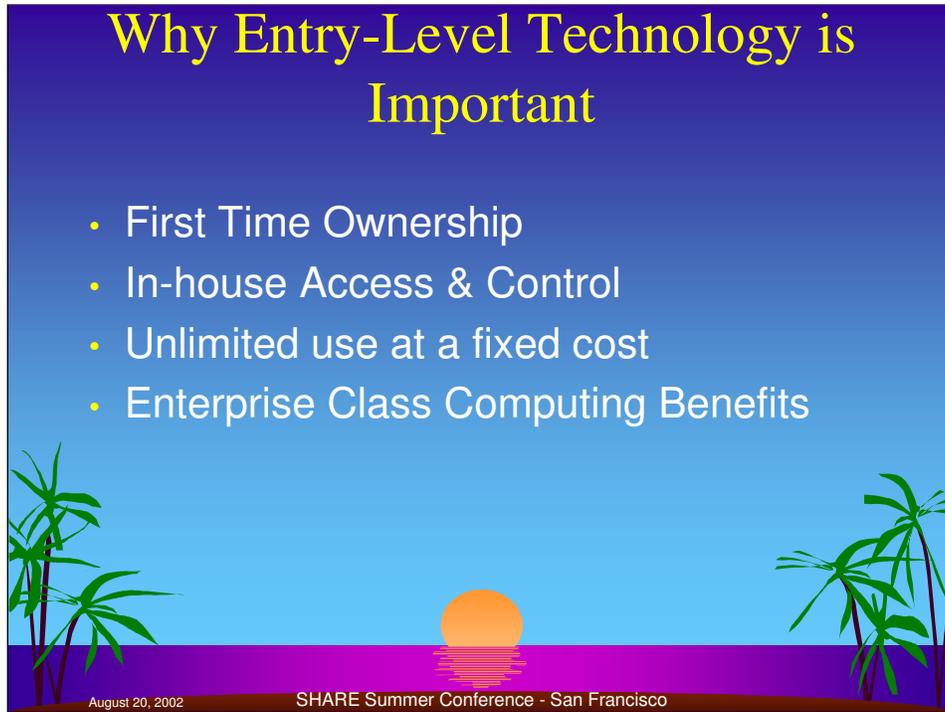


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Entry Level Technology has always resided in the “compromise zone” of System/390 architecture. This zone is an important market segment for many organizations since it represents a lower cost solution for mainframe compatibility. Compromise is the vehicle that allows lower cost to the end user (the IBM portion of the compromise) at the expense of performance (the user compromise). This type of compromise is common and beneficial to the industry since it can radically lower the entry level cost for world class computing. As competition increases, or manufacturing costs change, then so does the eventual end-user price. The only way to maintain lower end-user pricing is to introduce additional compromises or lower the profit margin. The latter is not an attractive option unless other collateral benefits can be exploited.

Some manufacturers have used entry level technology to drive the market demand for higher performance/higher priced products. By providing a low-cost, entry-level solution to a customer they can create long-term brand loyalty, gain acceptance for their specific version/brand of development environment, and hopefully create a future revenue stream with the potential sale of more technology to the first time customer.

IBM has historically been a leader in the technology “seeding” programs. In the early days IBM provided vast quantities of technology to universities world wide at a very low cost so as to gain acceptance for their brand of computing model. This plan worked magnificently creating a perception amongst newly hatched graduates that IBM provided the industry standard. Those graduates went on to stewardships at Fortune 1000 organizations as executive decision makers and they selected IBM products based on their personal educational experiences. This early marketing strategy catapulted IBM into the leadership position from the 70’s onward.



Why Entry-Level Technology is Important

- First Time Ownership
- In-house Access & Control
- Unlimited use at a fixed cost
- Enterprise Class Computing Benefits

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For software developers access to entry-level technology has been a great opportunity to obtain unrestricted access to their own IBM mainframe. In the past developers used service bureaus for processor timesharing paying for resources in the customary supply vs. demand fashion. Customer requests for operating environment changes could be restricted, characterized by delays and limiting flexibility due to external dependencies. The software developer of days past always fantasized about owning a mainframe so that they could control their own world.

Entry level technology meant that small companies that saw the value of world class mainframe computing could finally fight the prohibitive cost and join the heavy-metal club.

In the good old days, medium sized business had smaller mainframes in the 43xx class. For them the cost of maintaining the aging hardware coupled with higher environmental costs became an albatross around the neck during annual budget reviews.

For larger corporations distributed processing was an expensive proposition involving significant investment in environmental, real estate, power distribution, facility preparation, staffing, and collateral computer hardware. Distributed processing in the past meant a 3084 at HQ with multiple 4341/4381 class machines, with full data centers at district offices. But with newer, more cost effective hardware, distributed processing became more feasible and more cost effective.

It is obvious that entry level mainframes have had a major effect on technology deployment and application development. By lowering the cost of mainframe technology, legacy applications become cost effective reusable tools that can save money for customers by providing an extended life. More importantly, entry-level mainframes provided access to enterprise class computing. These benefits are, as we all know, considerable and valuable. The reliability, security and controllability of mission critical applications, large or small, can best be served by S/390 products. So it makes sense to encourage the use of mainframe technology. After all, if a new application is being developed doesn't it deserve the very best?

IBM Early Entry-level Processors

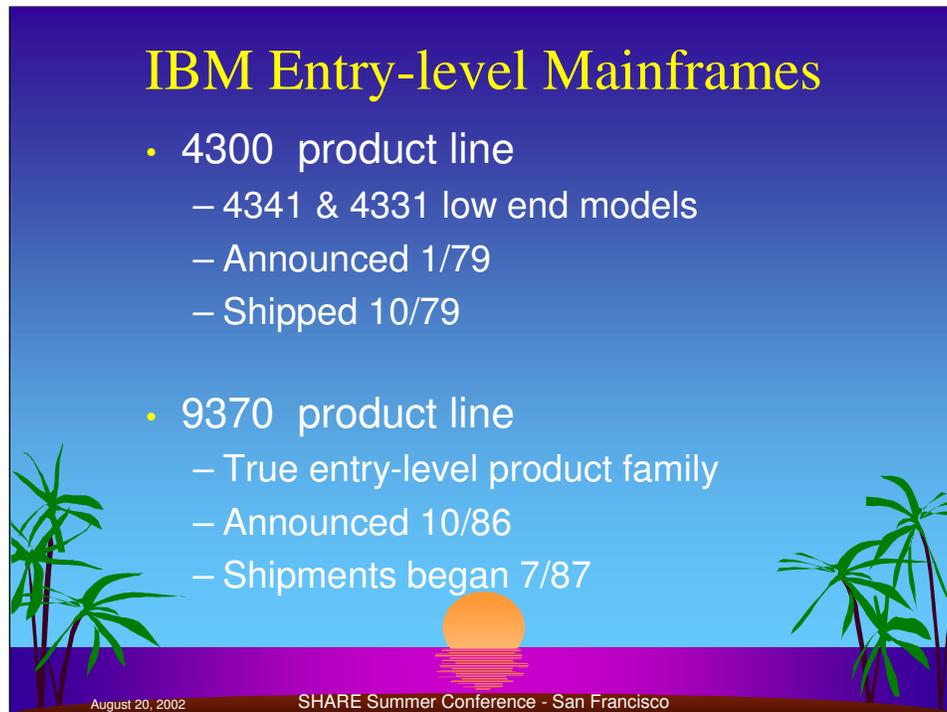
- System/360
 - S/360 model 40 first shipped April 1965
 - S/360 model 30 first shipped June 1965
 - S/360 model 20 first shipped March 1966
- System/370
 - S/370 model 135 first shipped April 1972
 - S/370 model 125 first shipped April 1973
 - S/370 model 115 first shipped March 1974

- ◆ SNA announced September 1974 !!
- ◆ TCP/IP commercially implemented September 1981 !!

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It all began in a quaint little village in the great state of New York. In 1964 the announcement of the System/360 computer system was destined to have a profound affect on the world of commercial data processing. By 1971 there had been a total of fourteen models in the System/360 product family line (models 20, 22, 25, 30, 40, 44, 50, 65, 67, 75, 85, 91, 95, and 195) of which thirteen were commercially available. The last shipment of new System/360 product occurred in June of 1971 with the model 22. Surprisingly, this early entry-level mainframe product started shipping six months after the first shipments of the new System/370 computer models. This illustrates the increasing demand for lower cost compatible platforms from the beginning thanks to standardization and a lack of legacy obsolescence.

The System/370 computer system was announced in June of 1970 and began shipping in January of 1971 with the model 155. This new product family boasted increased performance, more features and a lower cost of acquisition and operation as compared to the System/360 family. Thanks to the upward compatibility inherent in the design of the IBM mainframes of that era the System/360 products quickly found new homes with first time mainframe owners. The smaller 'entry-level' sized models of the System/370 line were announced in March 1971 (model 135), October 1972 (model 125), and March 1973 (model 115). The popularity of these smaller systems was evident in the model improvements announced in November 1975 (models 115-2 and 125-2) and June 1976 (model 135-3) extending the product life with the first shipments of these upgraded products starting in February 1976 and February 1977.

A presentation slide with a blue background and a sunset scene at the bottom. The slide title is "IBM Entry-level Mainframes" in yellow. It lists two product lines: the 4300 product line (announced 1/79, shipped 10/79) and the 9370 product line (announced 10/86, shipments began 7/87). The background features palm trees and a sunset over a purple horizon.

IBM Entry-level Mainframes

- 4300 product line
 - 4341 & 4331 low end models
 - Announced 1/79
 - Shipped 10/79
- 9370 product line
 - True entry-level product family
 - Announced 10/86
 - Shipments began 7/87

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The 4300 product line was introduced in 1979 and represented the first complete line dedicated to a specific segment of the mainframe market. The 4300 family offered legacy compatibility within a wide range of low cost models in the under 10-MIPS range. While larger corporations were moving from the 303x products to the 308x models in the early 1980's the 4300 was quickly becoming one of the most popular mainframes within the small and medium business market segment. This was great news for IBM since it was easy to see how new customers, even on low cost platforms, represented potential long term revenue. Many of these early entry-level customers grew into large corporations and the increased IT spending translated into increased revenue for IBM. To maintain legacy compatibility these new corporate giants invested heavily into larger, more powerful mainframes further bolstering the IBM long term revenue stream. The success of these "seed" programs gave credence to the marketing plans for the introduction of mainframe computers into virgin territory.

To encourage more mainframe application development and corresponding mainframe utilization IBM jumped on the distributed processing bandwagon in 1986 with the announcement of the 9370 product line. These small footprint, environmentally-easy mainframes could be quickly rolled into remote offices, multiple plant locations, or small corporate data centers. Application developers were provided with legacy compatibility, small size and low cost. Although the largest system in the family, the Model 90, was only 1.2 MIPS they easily found homes with VM and VSE data centers worldwide.

The cost-of-acquisition bar was being lowered quickly with the impressive technology adaptations and creative implementations of these diminutive giants. Machines would continue to get smaller and more powerful.

IBM Entry-level Mainframes

- P/390 and R/390 server family (1/1997)
 - OTC ESL Software
- Integrated server (9/1998)
 - OTC ESL Software
- Multiprise 3000 (9/1999)
 - Monthly GOLC Software (no ESL Δ)
- Numa-Q/EFS (3/2001)
 - Engine level OTC Software (ESL x 1,2,3,4)

ESL Software was key to the value of entry level mainframes

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In 1994 IBM formalized a plan to introduce a new low-end mainframe product into the marketplace. This technology offered a phenomenal price versus performance ratio and was originally offered only through the OEM channel. With the introduction of the *PC Server System/390 with Server-on-Board* in 1997 the cost of ownership dropped through the floor. For the first time in the history of mainframe processing the participation cost was within the reach of every data processing department budget. From 1995 through 1997 IBM continued to refine the design of this entry-level platform methodology and in 1998 released the now famous Integrated Server (3006-B01).

The Integrated Server is arguably the finest low-cost implementation of an IBM mainframe recently available. It had all of the factors associated with a successful product: low cost, reliability, excellent price vs. performance ratio, small size, and IBM maintenance. It lacked only one important characteristic: Upgrade ability. If you needed less than 10-MIPS of processing power this was definitely the platform of choice at the time. You compromised on performance and expansion for the lowest TCO of all time.

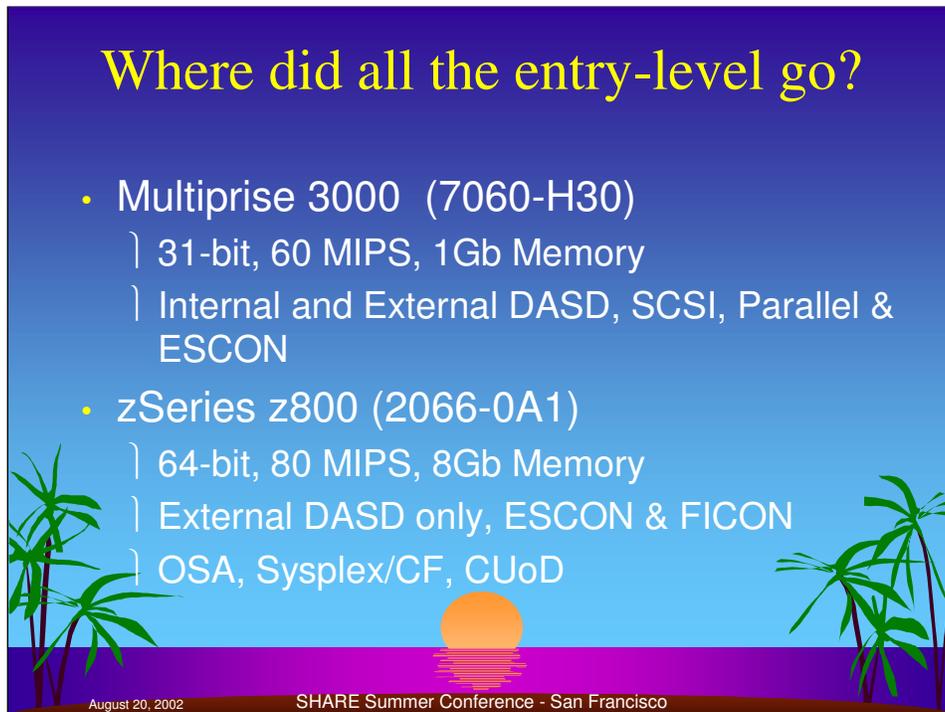
Why then did IBM announce the withdrawal of this product and all associated marketing programs? Simply put, the profit margin was just not enough and customers did not grow into larger systems. For IBM the cost to manufacture a 10-MIP mainframe is the same as the cost to build a 100-MIP powerhouse. Although the lower prices sold many systems, the cost for the support of those customers was greater than the revenue generated, and unfortunately these first time mainframe customers did not fit into the IBM growth model. The last Integrated Server was shipped late in the fourth quarter of 2000 to the distributor channel and all manufacturing has ended.

In an attempt to appease software developers and small data centers IBM announced an ill conceived hybrid offering that joined the Numa-Q hardware to the Fundamental Software FLEX-ES S/390 emulation software. This marriage was extremely short-lived, measured in days and hours. No sooner did IBM announce the product it turned around and cancelled all plans. Those unfortunate users that were early embracers of the technology were quite unceremoniously abandoned and alienated by IBM. Fortunately, Fundamental Software was able to rally to the challenge and offer ongoing support for the OS emulation software portion of the equation.

But changes to entry-level mainframe performance was only one piece of the new world puzzle that was being announced. The new 64-bit architecture heralded the dawn of a new era. The realities of the new millennium marketplace dictated a response to the competition, and to remain competitive a focus on hardware superiority was launched in conjunction with a focus on a more profitable product strategy.

Where did all the entry-level go?

- Multiprise 3000 (7060-H30)
 - } 31-bit, 60 MIPS, 1Gb Memory
 - } Internal and External DASD, SCSI, Parallel & ESCON
- zSeries z800 (2066-0A1)
 - } 64-bit, 80 MIPS, 8Gb Memory
 - } External DASD only, ESCON & FICON
 - } OSA, Sysplex/CF, CUoD



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No matter how much you loved entry-level technology, no matter how much you wanted entry-level technology, it failed to garner the required amount of success for IBM to justify continuation. The under 20 MIP market was killed off with the introduction of the Multiprise 3000 Model H30. For that matter, the under 60 MIP market was totally laid to rest. This 60 MIP 31-bit system became the smallest offering from IBM and hence the new standard bearer for S/390 entry level products.

The MP3000 offering, unlike the Integrated Server (3006-B01), did have an acceptable revenue profile for IBM. With the demise of the Entry Server License (ESL), as popularized with the Integrated Server, IBM once again saw long term annuity revenue from the monthly Growth Opportunity License Charge (GOLC). Although the MP3000 has a very small physical footprint it is a powerhouse of traditional S/390 capabilities. Although it does not have any zSeries hardware features, such as 64-bit architecture, it does provide a very cost effective platform, especially when using internal disk drives. However, the software license charge will scare most small shops. The CPU may be considered entry-level, but the associated software fee (annual + monthly) is quite the opposite. Since it is not capable of 64-bit processing any long term use must be tempered with the knowledge that it is a dead end box for future software releases, and rumor has it that it will be discontinued before the end of second quarter 2002. But as a Linux server the Multiprise 3000 is capable of supplying extensive server consolidation duties while circumventing the worst part of ownership: the operating system software license fees.

Enter the baby z900, code named "Raptor", and part of the z 800 family of zSeries hardware products. This new S/390 hardware platform is an incredible collection of features, function, potential, and more features. Definitely more like a z900 than a Multiprise 3000, it has the capability of taking the product family to places that IBM has only dreamed about in the past. Although IBM has had numerous product lines that spanned a wide range of potential uses, the z800 family captures the best features from it's z900 heritage and couples that with a flexible architecture design (CMOS 8SE & 8S 5-processor MultiChip Module) that provides the framework for upgrades within family and into the z900 line.

At the time of printing this presentation the IBM Generally Available (GA) low-end product offerings were limited to the Multiprise 3000 (7060-H30) and the new baby z900, the z800 "Raptor" (2066 -0A1). The Multiprise 3000 models H50 and H70 were withdrawn from marketing (new orders) on August 9th, 2002.

Z800 Family – Machine Type 2066

| Model | MIPS | MSU | Price | Maint |
|-------|------|----------------------|----------|--------|
| 0A1 | 80 | 13 | \$280K | \$56K |
| 0B1 | 115 | 20 | \$320K | \$64K |
| 0C1 | 143 | 25 | \$360K | \$72K |
| 001 | 192 | 32 | \$463K | \$92K |
| 0A2 | 259 | 44 | \$650K | \$130K |
| 002 | 350 | 60 | \$850K | \$170K |
| 003 | 499 | 84 | \$1.213M | \$242K |
| 004 | 636 | 108 | \$1.563M | \$312K |
| 0LF | 192 | Linux Facility | \$150K | |
| 0CF | 192 | Coupling Facility | \$150K | |

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The prices illustrated above are based on IBM Reference Prices for the various items. MSU Ratings are the published measured MSU values for each model, and are subject to change. Maintenance pricing is for CPU only with thirty-two ESCON channels and HMC.

The z800 family of S/390 CPUs will provide a very stable and flexible upgrade path within the z800 model line and into the z900 model line. So, unlike the Multiprise 3000 family, with its limited growth potential, and the Integrated Server with no growth potential, this machine provides a literal cornucopia of growth options to satisfy any data center requirement.

They say that you get what you pay for and that statement is true for this product family. The higher price brings with it more features and options than previous entry-level products raising the question "Is it really entry-level?"

Well according to the IBM stated direction for 2002 and beyond it is! Once again the bar has been raised for the designation of entry-level. The model 0A1 is currently the smallest 64-bit processor available in the IBM product family. And with the imminent demise of the Multiprise 3000 it will quickly become the smallest S/390 capable processor in the IBM bag-o-tricks.

The prices illustrated above are the manufacturer suggested retail price (reference price in IBM-speak). All discounting will be based on that reference point, and plenty of discounting will be available, but we will talk more about that later in this presentation.

A new software license plan will accompany this baby z900. The new plan is called *zSeries Entry License Charge* (zELC). Software license fees for the operating system and program product middleware will be based on an MSU value that is usually less than the actual MSU rating for the platform. In this fashion IBM is attempting to lower the initial cost of ownership by using an arbitrary lowering of the MSU rating for the purposes of software fee calculations.

The purchase of the CPU is only one aspect of the overall acquisition. There are numerous collateral items required to turn the z800 into a fully functioning mainframe complex, especially for new footprint data centers. First off you need DASD. Since the z800 does not have integrated DASD you have to have external disk such as the IBM ESS (Shark). If you have existing ESCON attached 3390 units they will move easily to the z800 and provide a simple transition, but if you are putting a new S/390 into a non-S/390 data center the additional cost for the IBM or EMC DASD can easily be in the \$375K+ range of budget spending. Then you have to add the interface for the master console, such as a 2074. This will add an additional few dollars to the overall cost, but then that's not all! IBM is also recommending that IBM Cabling Services provide the installation services specific to the FICON devices setup. The complexity of attaching FICON within the system environment is non-trivial and customer satisfaction hinges on a successful integration. Ka-ching, add a few more dollars and you quickly realize how the cost to acquire this entry-level technology is significantly higher than in the past. A small z800 with FICON attached DASD, a two-drive 3490 tape subsystem, and collateral hardware can easily amount to \$750K based on reference prices.



IBM Stated Direction - 2002

- Focus on services
- “Server” branding strategy
- Exit from 50 MIPS and under market
- Exploit Business Partners and IBM.COM for sales & marketing

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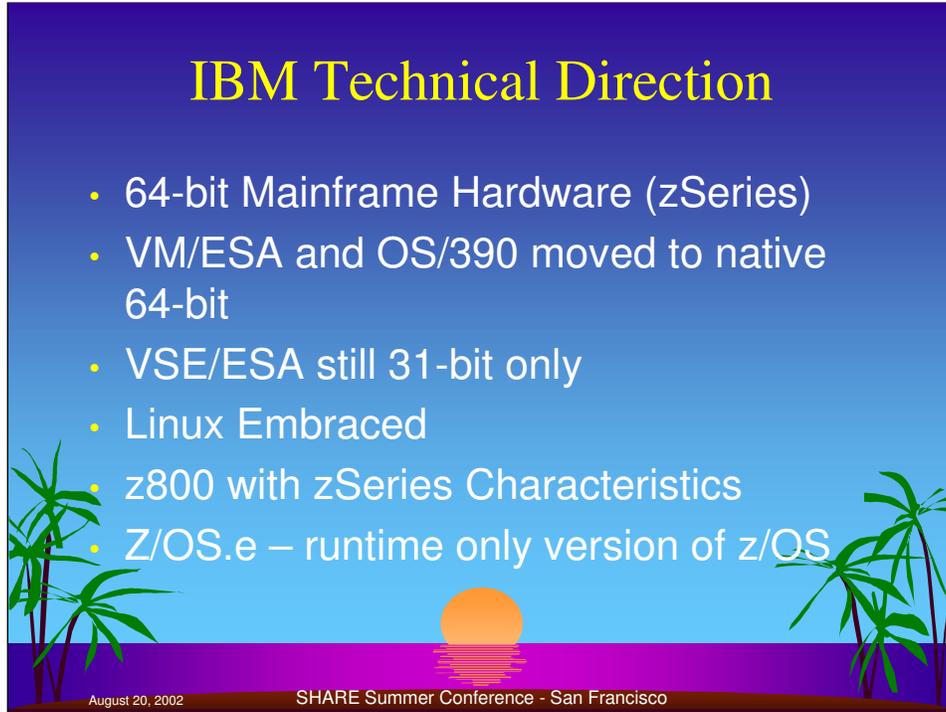
IBM is rapidly changing its business model so that it can adapt more quickly to the market. Already we have seen numerous changes in manufacturing, such as with the retirement of the data communications product line, and especially with the introduction of the z800. Where IBM was once fixated on total self sufficiency, manufacturing everything it needed from flashlights to tape drives, it is now content with integrating other vendor products into a solution offering so as to keep prices lower. The z800 series is being built by Hitachi under license for IBM and numerous IBM managers have stated that IBM is moving their overall philosophy to ‘invent, but not build’.

The once mighty sales force of IBM has been reduced substantially and refocused on more profitable efforts. The small and medium business markets have been turned over to Business Partners and even that sales channel is slowly degrading into a few large organizations as the smaller “boutique” partners fade away. But IBM is aggressively using IBM.COM to market and sell product in addition to the distribution channel, allowing IBM to recoup budget from less profitable activities and provide growth capital in the services area. In 2001, IBM.COM sales accounted for 11% of the total IBM revenue and is on the rise in 2002. This is significant income using a relatively inexpensive sales channel.

Services have been identified by IBM as key to a long term strategy and they are jumping into the arena loaded for bear. Linux, eCommerce, and web initiatives spell opportunity to IBM and they are actively pursuing engagements with all sizes and types of customers.

The revenue from mainframe sales has always been substantial. But the cost of manufacture coupled with the cost of support lowered the profit margins on the less expensive models. IBM had total revenue in 1999 of \$87.5B with \$4B in profit, while in the year 2000 total revenue was \$88.4B with roughly the same profit. Mainframe revenue in 1999 was \$3.3B, down from \$6.1B in 1995. In 2001 worldwide sales revenue was \$85.9B, down 2.9% from 2000. The good news for the S/390 Division was the increase in zSeries hardware revenue, up 15% over the previous year. But this should not be interpreted as an indicator of greater S/390 installation penetration, rather it illustrates the IBM success to derive more revenue from S/390 sales.

So far for 2002 the results are not encouraging. In the first quarter zSeries mainframe sales were down 21%, and down 16% in the second quarter as compared to 2001. Mainframe shipments based on zSeries MIPS increased 4% in 2002, but this is most likely due to the larger box offerings and lack of small box offerings. Shipping more MIPS does not necessarily equate to more footprints or to more customers.



IBM Technical Direction

- 64-bit Mainframe Hardware (zSeries)
- VM/ESA and OS/390 moved to native 64-bit
- VSE/ESA still 31-bit only
- Linux Embraced
- z800 with zSeries Characteristics
- Z/OS.e – runtime only version of z/OS

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The entry level technology strategy from IBM has changed dramatically over the past year. IBM is unwilling to make and sell a small system that is unprofitable and unfortunately the Integrated Server was not profitable. The new philosophy now appears to be that as processors get bigger and more powerful (such as the zSeries Freeway Processor) the entry level products must also become bigger. The Multiprise 3000 has an entry level processor (the model H30) that is six to eight times faster than the Integrated Server. The z800 entry level product (model 0A1) is operating as a sub-uni processor (speed reduced CPU) and is roughly the performance of the MP3000 model H50. This represents a relatively large jump in the entry point for S/390 compared to previous product lines.

Once the transition to 64-bit hardware is complete there will be limited usefulness and value to the older architecture beyond the next three years, and I speculate that two years may end up becoming the realistic useful life. Already we are seeing used Multiprise 3000 products hitting the market and on eBay.

z/VM (the follow on to VM/ESA) and z/OS (the new OS/390) will run on the older 31-bit hardware as well as on the new 64-bit hardware. However the product plan for z/OS indicates that 31-bit support will be discontinued after Version 1 Release 5. VM will provide significant features for the hosting of 31-bit or 64-bit guests on the new hardware and will continue to be a major player in the data centers of the new millennia. VM, when executing on zSeries hardware in 64-bit mode, will be able to provide some benefits to older 31-bit software such as VSE/ESA and TPF, the most significant feature being virtual storage constraint relief available to all guests regardless of execution mode.

A runtime only version of z/OS has been announced that will only operate on z/Architecture platforms in LPAR mode. This version of z/OS, named z/OS.e, will provide all of the base features found in z/OS but will not be able to run CICS, IMS, COBOL, PL/I, FORTRAN, or VisualAge PL/I. This runtime only version will actually lower the cost of software by up to 50% for customers that do not require those specific development tools.

VSE customers can certainly run on the new multi-mode hardware but will not receive all of the benefits afforded by this new architecture. However, running as a guest under z/VM will provide significant virtual storage expansion.

Linux is certainly proving itself to be a real contender in the race for new workload environments. Multiple versions are available that support both 31-bit and 64-bit operation so regardless of platform you can install and operate a web-efying application on S/390 hardware. IBM has totally embraced Linux and has made the promise of low-cost S/390 Linux a reality. The z800 Linux-only hardware offering provides an incredibly effective low-cost, high performance environment for Internet based and server consolidation projects. In fact the Linux only version of the z800 is the most cost effective S/390 mainframe environment that I have ever witnessed. Not only do you get full uni-processor power (192 MIPS), but you get it at a price that is incredibly reasonable.



Investing in technology for use in mission critical applications is about as rewarding as pumping quarters into a Las Vegas slot machine. Sometimes you win, but not always. Selecting the right technology bandwagon that will still be viable in five years has become increasingly more difficult.

In the past two years time we have seen the emergence of a new hardware initiative from IBM to expand the role of the mainframe as an enterprise server. IBM has systematically been able to divorce itself from 24-bit and 31-bit architecture design constraints, heralding in a new paradigm with 64-bit power and punch. The need to move the mainframe into a new world was obvious but the cost to get into the game has begun to increase.

Many customers have only recently upgraded to ESA 31-bit capability and are now looking at yet another change looming on the horizon, 64-bit. Sooner or later, and it will be unavoidable, an upgrade will be required.

And what is to come of our older platforms? S/390 systems with 24-bit only capability are boat anchors today. Of no use to anyone except museums or die hard collectors. A 31-bit system can still be used effectively for development and certainly represents the majority of platforms in use today for production. New customers will undoubtedly opt for the newer 64-bit environment. The transition to 64-bit is definitely going to require a considerable amount of time and cost. The justification of that cost may become increasingly difficult in the future as data center managers begin to deal with the realities of the economy.

When I talk with various executives from S/390 shops I continue to hear a recurrent theme: "cut costs." Since the early part of 2001 the economic slowdown of our nation has directly affected the budgets of corporate America. The result has consistently been to reduce the spending across the board, and MIS/DP is no stranger to this stranglehold. Many shops have elected to place all acquisitions, upgrades, and enhancements on hold until a later date. When this occurs projects that were once a high priority are now relegated to status-quo. If it's running, and the immediate corporate needs are being met, then don't fix it.

It is going to be quite difficult to justify the cost for an upgraded z/OS environment with the new IBM hardware on the basis of traditional processing only. If corporate processing is currently limited to z/OS then the cost to upgrade from an older platform to new hardware and new software may be quite prohibitive. Factor in the need for staff training and the corporate resources required to actually perform the upgrade and/or conversion and all of a sudden the overall cost can be too high to justify without including additional cost savings.

If the corporate direction is towards aggressive web processing, eCommerce, or Internet resource management then the possibility exists to include those projects into the S/390 upgrade and gain a better overall cost-of-processing structure that will lower the overall cost of acquisition. Server consolidation using Linux is a hot button right now for many vendors. And if your organization has a large investment in Sun or Intel based servers a considerable cost savings can be realized through a consolidation of all processing to S/390.

Acquisition Tactical Alternatives

- PCM options gone!
- Used system market possible short term alternative
- Consider server consolidation to justify the TCO
- Linux is the HOT button!

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As of March 2002 Amdahl (now Fujitsu IT Holdings, Inc.) will not commit to 64-bit processors citing the cost associated with developing compatible new technology as greater than any expected return. Amdahl continues to offer the IBM compatible Omniflex and Millennium family of CMOS ESA capable processors. Hitachi had announced its withdrawal from the market in early 2000. In 2001 and 2002 IBM is the dominant market owner with 88%. Amdahl had 9% and Hitachi a dwindling 3% market share.

The used market, with the very attractive boat anchor pricing, is not an option unless you have no intention of upgrading to a 64-bit operating system in the future or your need can be delayed without ramifications for three years. For all of the short term cost savings that can be garnered from a used market purchase the tradeoffs can be substantial. Used 2003 type machines are in the \$15K-30K price range and older 9672 types are declining rapidly in value, especially for the smaller models.

Failure to upgrade to a newer O/S will merely defer the inevitable. Eventually, support service for the 31-bit systems will be dropped, newer application software may only run on newer hardware, new O/S features will not be available for the older O/S in residence, and hardware service costs may increase beyond expectations. All of these issues will light a fire under the feet of data center managers as they attempt to juggle the need to control cost alongside the need to advance technology for the good of the enterprise.

The least impact will occur for VSE shops. Although VSE/ESA does not enjoy the same frenzy of technology updating compared to z/OS, this is viewed by some as a blessing in disguise. Since VSE still operates within the 31-bit domain it can use any platform with relative ease. VSE/ESA at the Version 2 Release 7 level will include hardware support for execution on z800 platforms, hardware encryption facility access, HiperSockets, and ALS2. And don't forget you can utilize z/VM to provide considerable virtual storage constraint relief when operating multiple VSE guests. And you can do it all on the used and soon to be discontinued hardware platforms and take advantage of the lower hardware cost! Not a bad situation overall since it provides significant flexibility in the decision to include web/e-commerce initiatives with Linux to the corporate plan.

The best TCO will be experienced by shops that use the S/390 for multiple missions. Historically it has been the general philosophy to separate workloads to different platforms and that usually created a mainframe area and a server farm area. By using Linux for S/390 it will be possible to process traditional workloads (z/OS, VM, VSE) alongside of the new Linux server functions. Rather than a single mission S/390 complex you can have a multi-purpose tool to lower the total data center cost of operation. The cost savings experienced when the processing load of a room full of servers is migrated to a single S/390 platform can be quite substantial.



The IBM Business Partner program has been decimated recently with the termination of several well respected partners, including one of the two remaining S/390 distributors, for failure to meet the Minimum Annual Attainment (sales quota) level for the 2001 reporting period. Couple that resource loss with the business failure of one of the oldest and seemingly most popular S/390 Business Partners early in 2002 and it is easy to see that the whole channel marketing strategy from IBM is in deep trouble.

Economic conditions in 2001 were horrific for business operators. Profitability for SP2 Business Partners (the smallest of the remarketing partners) has been difficult and mostly non-existent this past year.

This is all bad news for an industry segment already suffering from a declining S/390 presence in the data center of the past five years. But bad news for the seller is translating into good news for the purchaser. The IBM Business Partners are so desperate to make a sale that the competition is, well very competitive; with discounting a normal component of the transaction.

Discounting exists for each component of the sale: hardware, software, services, and financing. The discount percentage range varies for each of those product types and can be dependent upon other factors. If the installation of a new z800 or Multiprise represents a new footprint then your possible discount percentage is different than if you are merely replacing an existing S/390 processor with a newer model.

Right now the hot buttons for large discounting surround Linux. Linux is such a major focus for IBM that the best deals with deepest discounts can be had if there is even a hint of Linux implementation in a customer request for bid. Discounting will get deeper as year end approaches. But you have to ask for the discounts to receive them. If you don't ask you won't get!

The recent sale of a z800 to a County Government in the State of Virginia illustrates the importance of preparing your negotiation tactics in advance. The contracting officer failed to research the various discount based programs available from IBM. The Business Partner, smelling a huge sale, did not inform the customer of any discounting. Subsequently the customer ended up paying list price for the z800 and peripherals. The price was \$60K more than the price paid by the commercial customer down the street for almost the exact same configuration!

Find a Business Partner that you can trust and that understands your unique problem. Ask them to share with you the latest discount information from the IBM Business Partner Play Book. This document illustrates all of the applicable 'promotions', 'special deals', and discounts available. IBM will not automatically ensure that you receive all of the discounts that you are eligible to receive. It is up to the individual Business Partner to bring them to your attention. If he does not give you a discount that you qualify to have, he pockets it. Where do you want that money to go, his pocket or yours?



IBM does not set the market price for the z800. The Business Partners are responsible for all remarketed hardware, software, maintenance and services pricing to the customer. The Business Partners buy the hardware and software from IBM through the distribution channel and resell the products at an arbitrary price somewhere between their purchase price and the IBM published reference price.

The discount that you the customer can expect to receive will be based on several factors. The amounts illustrated above are based on a typical package of hardware, system operating system software and maintenance, and includes a combined discount of all products (hardware, software, maintenance and services).

IBM categorizes a system sale as either Traditional or New Workload. Traditional would encompass the existing S/390 data centers that are migrating to the new platform from an existing S/390 processor. A new workload is the plum of the orchard for IBM and will garner the largest discounts. So the larger discounts can be applied to new footprints, and if you can also include a Linux-only server consolidation engine in the proposal the system will qualify for even more discounts.

Not to harp on a subject, but it is important that you understand that in most cases it will be up to you to push the Business Partner to give you all the discounts that you qualify to receive. It is not automatic and unless you ask, you will not receive. Finding out what discounts and special promotions may be available is difficult since I find that most Business Partners are unwilling to share that information with a customer. Too many sales people feel that those discounts are “tools” that only need to be used if necessary. Ask the Business Partner to sit down with you and walk through the Business Partner Playbook with you so that you can better understand the available programs. Knowledge is power. With it you can make a better, more informed decision.

Entry Level Mainframe Suggestions & Recommendations

- Hardware needs dictated by software
- Software needs dictated by business
- Create 3 year, 5 year plans
- Defer upgrade if practical
- What are you willing to compromise?

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If your programming needs can be satisfied with 31-bit architecture then the need to jump on the 64-bit train may not be critical today. By the same token, the new releases z/VM and z/OS will execute on 31-bit hardware albeit with some feature limitations. But this provides some useful life extension for the older processor complexes that want to move to newer technology in small steps, distributing the cost over a longer period of time. If your current version 2 software can satisfy your business requirements for 1 to 2 years then wait and see what the future holds for pricing. At worst you can purchase a used Multiprise 3000 at a discount.

With VSE seemingly destined to be a 31-bit system for the foreseeable future they can still take advantage of the lower cost older technology. The soon to be discontinued MP3000 will make an excellent choice for VSE data centers that have a stable traditional workload.

The new zSeries hardware will provide IBM with a powerful foundation for new features and capabilities. Our industry appears to be speeding towards the integration of E-Commerce, business data, internet access and WEB processing into the basic "day-to-day" business functions. If your needs are firmly rooted in S/390 64-bit then your goal should be to consolidate as much processing as possible onto the S/390 platform and get the lowest price based on workload category and incentive discounts.

For most customers the decision will be based on the needs of the business and the budget. Technology is a series of compromises dictated by budget, resources, requirements, and availability. The winners and losers will be judged based on rational decisions made after review of all factors that drive the business and the industry.

Entry Level mainframe products have changed radically from the last millennia. You can expect to pay higher costs to get into a first time mainframe, especially a small system, but the real value comes with the environment: A rock solid hardware platform coupled with some of the finest operating systems in the world. It still makes sense to develop an enterprise methodology around System/390, it just costs more than previously. Whether or not you can make a business case to justify the increase in budget costs is the issue. In some data centers the mainframe can be justified through consolidation. If numerous e-Business servers are currently in use perhaps their functions can be migrated to the S/390 along with new development. The cost savings realized through consolidation can sometimes offset the slightly higher cost for the new entry-level S/390 systems.

Bottom line: Take care of business. Do not chase technology for the sake of technology advocacy or a misguided need for the latest and greatest. It is just as easy to make a business case for S/390 on merits and value to the enterprise.

Entry Level Alternatives S/390 & zSeries Emulation

- ▲ Flex-ES - Fundamental Software
- ▲ UnFrame – UMX Technologies
- ▲ Hercules S/390 – open source
- ▲ Soft390 Virtual Mainframe - Platform Solutions

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Over the past three years our industry has experienced a tremendous increase in interest for S/390 architecture emulation. The primary motivation has been for cost containment of mainframe ownership. The cost for mainframe hardware has continued to plummet over the past five years while at the same time the cost for software licensing has continued to increase. With the introduction of the S/390 Integrated Server, IBM had finally hit upon the magic formula for first time mainframe owners and entry level customers. The Integrated Server had a very very low hardware footprint cost. But more importantly it had a reasonable and quite justifiable software license cost based on a one-time charge perpetual license.

With the demise of the entry-level program by IBM many customers went scrambling over the rocks looking for alternatives in the hope that they would find lower costs and growth potential. The emulation market has become the latest craze for low-end mainframe users and can offer a low cost for the hardware and a reasonable cost for software licensing. Not as low as the Entry Server License (ESL) that was associated with the Integrated Server, but certainly less expensive than the Multiprise 3000 and z800.

These adaptations have many compromises associated with implementation but for application developers and testing organizations they offer a lower cost when compared to traditional heavy-metal products. When considering these options a data center must be wary of compatibility issues and the operation of applications under emulation, especially during abnormal conditions. An error condition under emulation may not exhibit the same characteristics on a real mainframe.

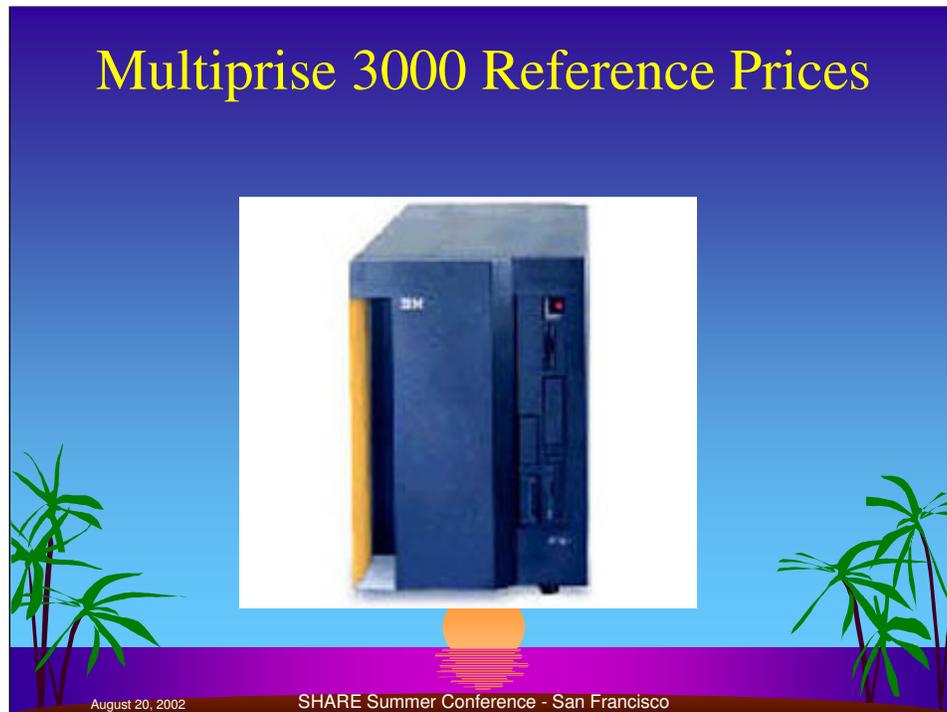
For additional information on the various products that are currently available you can use the URL's listed below to reach the web sites of the various organizations.

Fundamental Software – www.funsoft.com

Platform Solutions – www.platform-solutions.com (a new spin off from Amdahl)

Hercules Emulator open source: <http://www.conmicro.cx/hercules/>

UMX Technologies – www.umxtechnologies.com



The following pages have been included from an earlier presentation at the previous SHARE conference in Minneapolis so as to illustrate the costs associated with the then new Multiprise 3000. The prices used within these pages are based on the IBM reference but don't really apply today due to the withdrawal of the Model H50 and H70 processors, and the soon to be discontinued H30.

Discounting of the MP3000 product line is extensive, and it is not unusual to obtain up to a 30% reduction in the hardware cost, 20% on the maintenance fee, and 17% on the software cost. With the imminent product devaluation due to withdrawal from marketing you should expect significant discounts on the Multiprise 3000 line. From what I have seen with the used products being sold by IBM Global Financing you can expect very attractive pricing of the MP3000 refurbished hardware. With these types of discounts the 7060 product line can become a very attractive purchase for VSE/ESA data centers, especially if one of the CPU engines is dedicated to Linux.

Linux on 31-bit boxes is a great idea. The lower cost for the hardware make this a very justifiable implementation of server consolidation using Linux.

With the removal of the Multiprise 3000 products from general marketing you will be able to see significant quantities of these boxes on the used market. The price for a used box can be very attractive if you can accept the 31-bit limitation. The popular eBay web site has recently had several IBM S/390 Integrated Servers, Multiprise 2000, and Multiprise 3000 systems listed by IBM Global Financing. These refurbished machines are available at prices at least 50% lower than published list reference pricing, and in some cases, discounts of 60%-65% have been observed. If you don't need 64-bit then these used systems should be seriously considered.

**Financial Analysis 7060-H30
5-Year Plan**

| | |
|---|---|
| <ul style="list-style-type: none"> • OS/390 <ul style="list-style-type: none"> – HDW \$ 218,124 – SFW \$ 12,771/MLC – Maint \$ 50,192 <p style="text-align: center;">5-Year Total: \$1,034,576 Per year: \$206,915</p> | <ul style="list-style-type: none"> • VM/VSE <ul style="list-style-type: none"> – HDW \$ 218,124 – SFW \$ 18,132/MLC – Maint \$ 50,192 <p style="text-align: center;">5-Year Total: \$1,356,236 Per year: \$271,247</p> |
|---|---|

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The Multiprise 3000 is a powerful system with capabilities far exceeding previous entry level platforms. This huge MIPS capacity has prompted some customers to question its categorization as an entry level product. But entry level CMOS it is, in the new IBM scheme, with plenty of capacity and bandwidth. It does keep a few features from the P/390 product line, such as the ability to implement limited emulated I/O (EMIO). But the cost is higher than the most recent past offering and although you do receive a lot for your money you will definitely be spending more. The monthly license charge alone will probably scare most first time S/390 owners away. However this processor is a real contender with LPAR capability and significant CPU performance. As an entry-level system this would certainly provide growth potential for an enterprise while allowing a field upgrade to the H50 when additional capacity is desired.

Pricing illustrated above is based on the MSRP or IBM reference price. Discounting is available and can be substantial.

Hardware:

- IBM 7060-H30 1Gb Memory 60 MIPS
- (11) 18.2Gb SSA Disk Drives
- (3) 9.1Gb SSA EMIO DASD
- (1) ESCON Adapter
- (1) Differential SCSI Adapter
- (2) Ethernet Adapters
- Monitor, KB, CD-ROM, 4mm DAT
- Exide SE3000 UPS
- IBM 3490E-F01 w/ACL & 30 Tape Carts

Software: (VM/VSE)

(OS/390 described on previous page)

- | | |
|-------------|--------------|
| VM/ESA V2R4 | VSE/ESA V2R4 |
| PVM | VTAM |
| RSCS | CICS |
| HLASM | DFSORT |
| TCP/IP | HLASM |
| COBOL | LE |

Financial Analysis 7060-H50 5-Year Plan

| | |
|--|---|
| <ul style="list-style-type: none"> • OS/390 <ul style="list-style-type: none"> – HDW \$ 259,191 – SFW \$ 18,331/MLC – Maint \$ 76,488 | <ul style="list-style-type: none"> • VM/VSE <ul style="list-style-type: none"> – HDW \$259,191 – SFW \$ 21,793/MLC – Maint \$ 76,488 |
| <p>5-Year Total: \$1,435,539 Per year: \$287,108</p> | <p>5-Year Total: \$1,643,459 Per year: \$328,692</p> |

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The model H50 of the 7060 (Multiprise 3000) product family is capable of significant processing capacity at a relatively low cost (within the product family). In the old days a mainframe of this size and caliber would require considerable floor space and environmental conditioning. But with the miracle of technology reducing size and improving heat dissipation IBM has been able to pack more power and punch into smaller and smaller packages. This machine is no larger than a Integrated Server but is approximately 14 times faster. The smaller model H30 can be field upgraded to an H50 in a matter of minutes merely by loading new microcode, so if your needs for CPU capacity grow quickly it will be easy to added extra cycles to your resource pool.

Pricing illustrated above is based on the MSRP or IBM reference price. Discounting is available and can be substantial.

Hardware:

IBM 7060-H50 2Gb Memory 115 MIPS

(11) 18.2Gb SSA Disk Drives

(3) 9.1Gb SSA EMIO DASD

(1) ESCON Adapter

(1) Differential SCSI Adapter

(2) Ethernet Adapters

Monitor, KB, CD-ROM, 4mm DAT

Exide SE3000 UPS

IBM 3490E-F01 w/ACL & 30 Tape Carts

Financial Analysis 7060-H70 5-Year Plan

| | |
|---|---|
| <ul style="list-style-type: none"> • OS/390 <ul style="list-style-type: none"> – HDW \$ 413,191 – SFW \$ 29,451/MLC – Maint \$ 116,776 | <ul style="list-style-type: none"> • VM/VSE <ul style="list-style-type: none"> – HDW \$ 413,191 – SFW \$ 29,344/MLC – Maint \$ 116,776 |
| <p>5-Year Total: \$2,297,027 Per year: \$459,405</p> | <p>5-Year Total: \$2,290,607 Per year: \$458,121</p> |

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The H70 represents the current largest model of Multiprise 3000 offered by IBM. This is a wonderfully compact S/390 mainframe that requires very little floor space and environmental conditioning. With the capability of attaching up to 56 parallel or ESCON channels this little baby is capable of performing tremendous amounts of processing. The option for integrated DASD opens up a whole world of compact data center possibilities that offers lower costs for hardware service, environmental cooling, power utilization and real estate.

The visual image of this physically small mainframe running perhaps ten logical partitions supporting hundreds or thousands of users is almost unbelievable. Size used to matter and be relative to power but the MP3000 line certainly dispels that old adage in grand fashion.

Pricing illustrated above is based on the MSRP or IBM reference price. Discounting is available and can be substantial.

Hardware:

IBM 7060-H70 Dyadic w/4Gb Memory 190 MIPS

(11) 18.2Gb SSA Disk Drives

(3) 9.1Gb SSA EMIO DASD

(1) ESCON Adapter

(1) Differential SCSI Adapter

(2) Ethernet Adapters

Monitor, KB, CD-ROM, 4mm DAT

Exide SE3000 UPS

IBM 3490E-F01 w/ACL & 30 Tape Carts