OIT-0396

DDA/REG LOGGED

ROUTING AND RECORD SHEET

SUBJECT: (Optional)

Reports of Visits to WANG Corporation

FROM:		EXTENSION	NO.	
DD/OIT-O 2D00 Headquarters			DATE 14 MAY 1986	STAT STAT

TO: (Officer designation, room number, and building)	DATE RECEIVED	DATE FORWARDED	OFFICER'S INITIALS	COMMENTS (Number each comment to show from whom to whom. Draw a line across column after each comment.)	
Exo/DDA 7D18 Headquarters	14 MAY 1986		Su	cc: D/OL) done 15 May 86	
2. ADDA	15 MAY 1986		q		STAT
3. DDA	15 MAY		N		
4. ER	16 MAY 1986		JCK		
5. Ex Dir M	19 MAY 1986		JT	3 to 5: Background + history re WANG.	
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10. ExoDDA	20 MAY 1986	20/5	801		
12. DDA Reg.				50-1	
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OIT-0396-86

1 3 MAY 1986

MEMORANDUM FOR: Deputy Director for Administration

VIA: Edward J. Maloney   STAT
            Acting Director of Information Technology

FROM: STAT
   Deputy Director of Information Technology – Operations

SUBJECT: Reports of Visits to WANG Corporation

    1.   Attached you will find relevant trip reports, as a follow-up to Dr. Wang's recent visit to the EXDIR. While the specifics of the Agency workstation direction have evolved, it is pretty clear that we were communicative to WANG Corporation on our general direction. There are other trip reports in the file which, taken together, show a pattern of effort on the Agency's part to work closely with one of its major vendors.

    2.   I have also attached a recent article on WANG, the company and chairman, to provide some general background.

                                      STAT
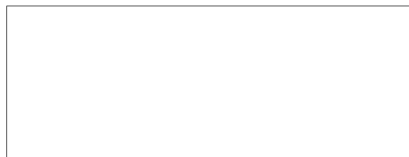
Attachment:
  As stated

ADMINISTRATIVE INTERNAL USE ONLY

2 February 1984

MEMORANDUM FOR THE RECORD

FROM: STAT

    Chief, Word Processing Branch, TD/PSG/ODP

SUBJECT: Report on Trip to Wang Labs on 25, 26 January 1984

                         STAT

   1. On 25 January 1984,   , Chief of Processing
Systems Group,   , Chief of Systems Engineering Group and STAT
      , Chief, of Word Processing Branch visited Wang STAT
Laboratories in Lowell, Massachusetts to discuss Wang's response to STAT
Agency requirements for a multifunctional work station. Additional
details on this meeting are included in the trip report by   STAT
     .

   2. On 26 January 1984,   remained at Lowell to STAT
discuss Wang's new electronic mail product, Wang Office and was
joined by Agency personnel from OC, OSO and the DDO/IMS.

   3. A prototype of the tempest version of the Epson FX-80
printer which Wang proposed to satisfy a requirement of the OC
Intelligent Communications Terminal contract was shown to the Agency
personnel before the Wang Office presentation.

   4. Al Fox from Wang Labs gave a Product Marketing presentation
on Wang Office. A Wang Office Network consists of a Wang VS and
multiple Wang Systems which can include the Alliance, OIS, VS, Wang
PC and Wang PIC systems. On the Wang VS System, VSOFFICE/1 includes
time management task management, messaging, and electronic mail.
VSOFFICE/2 has the additional capabilities of VS/IIS word processing
software and information storage and retrieval capabilities whereas
VSOFFICE/3 adds Alliance work processing, information storage and
retrieval, business graphics and data inquiry/reporting software.
Wang Office on an Alliance System includes Wang Office Mail and a
Wang Office File manager. The File Manager requires a dedicated
work station and is limited to the management of mailed documents
(Visual Memory cabinets cannot be transferred). The VSOFFICE/1 will
be available in June 1984. OC personnel asked a number of questions
concerning their present application, specifically requesting
information on applications interfaces for Wang Office.

   5. Dave Fowler from Wang Labs discussed Wang Systems
Networking (WSN) in the afternoon which provides for a variety of
communications options between Wang Systems. WSN products are
developed in a framework similar to the Open Systems Interconnection
(OSI) model developed by ISO. The seven OSI layers fall into three

functional categories in WSN: transports, services and
applications. WSN products include completely new products such as
Wang Office (application layer) as well as Wang repackaged products
such as File Transfer (services layer). WSN products should be
available in June 1984.

STAT

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          1 - WPB/TD/PSG/ODP
          2 - ODP Registry

INSIDE THE INDUSTRY

Wang Is On The Bleeding Edge: Does 'The Doctor' Have The Rx?

Founder An Wang is running his office systems firm again, but can he do enough soon enough?

An Wang, the founder, chairman, chief executive, and patriarch of the $2.3 billion company that bears his name, has spent 35 years reaching for the top in American business, but he still speaks with the accent and haphazard syntax of a Chinese immigrant. An Wang's message, nonetheless, is clear—and clearly American. He does not quote from Confucius or Lao-tzu. Instead he cites Red Auerbach, the American philosopher who is also the general manager of the NBA's Boston Celtics, on the subject of the basketball playoffs.

"I just read a book by Auerbach called *On & Off the Court*," Wang reports. "When the Celtics were one or two games behind in the fifth game of a seven-game series, he said, 'Don't worry about the six or seventh game. Worry about the fifth game. And not about the whole game. Let's worry about the first quarter, then the second quarter, third quarter, the final quarter.'"

The concept is relevant to An Wang right now. His company, Wang Laboratories Inc., was the corporate equivalent of a perennial league leader until a couple of years ago. Now, it's one or perhaps two games down in a series of uncertain length. While the name "Wang" is virtually synonymous with word processing, the company's hegemony in office systems is threatened by powerful competitors—companies such as IBM, AT&T, Digital Equipment Corp., Data General Corp., and Hewlett-Packard Co.

Earnings plunged after three decades of continually rising profits, but the company is now marginally profitable, only slightly better off than it was in the spring quarter last year, when it reported a loss of $109 million.

What's more, users are dissatisfied. According to a recent survey of 19 Wang installations by PaineWebber Inc., the company's users feel increasingly that Wang "simply cannot compete in the office" against IBM or DEC. They are unhappy about the company's high maintenance fees and spotty support, according to

Dr. An Wang's hand on the helm has reassured some users—and investors

PaineWebber analyst Stephen Smith.

Uncertainty surrounds the founder himself. An Wang is 66 years old, presumably nearing retirement. His most obvious successor is his son, Frederick A. Wang, but the prospect of Fred Wang's taking over arouses little enthusiasm either inside or outside the company (see related story, page 38).

The problems of Wang Labs have various roots, but key to most of them is the fact that the company has reached a turning point. Standalone word processors no longer provide enough business to generate substantial revenue. They have been overtaken by office systems, and increasingly those systems must be integrated with corporate data processing systems. and, in most cases, that means that the office systems must be integrated with IBM systems. What Wang has to do is figure out how to live with IBM without feeling overwhelmed by it—a delicate, extremely complex task.

Once upon a time, things were much simpler for An Wang. He started the company, now based in Lowell, Mass., in 1951 at the south end of Boston. Originally founded to make specialty electronic devices, Wang's business shifted to typesetting equipment, then to electronic desk calculators. The firm grew steadily as it adapted itself to changing markets,

and it became a $1 million company by 1964.

The calculators sold well through the 1960s, but advances in electronics eventually enabled overseas competition to produce much cheaper instruments. "We found the calculator being based on a single chip or a few chips. Our calculators stopped selling when the price of competing brands dropped from $1,500 down to $500," An Wang recalls. "We said, 'No way, we're not interested in this.'"

By 1971, the business of the company had shifted again, into the emerging world of word processing equipment. An Wang's mastery of electronics, combined with his business acumen, made Wang a $200 million company by 1978. With more than 50,000 users, it was the world's largest word processing vendor. By 1984 it had expanded into full-fledged, minicomputer-based office systems, namely the 2200, OIS, and VS systems. Its revenue that year was $2.1 billion, with profits of $210 million.

At about the same time, however, Wang had begun to feel the pressure of increased competition that was brought on by the changes and new uses of technology. Microcomputers were becoming more and more common in the office environment, altering the configuration and the uses of office systems. As usage changed, so did Wang's business. It no longer provided easy-to-use, reasonably priced word processors for secretaries and typing pools—equipment usually sold to office managers. The company found itself dealing with MIS managers, who had no particular loyalty to Wang, but quite a bit to IBM and the other large-systems vendors.

In response, in October of 1983 Wang announced an ambitious plan to introduce a wide-ranging series of products that included Pace, a fourth-generation language and relational data-base management system; the Wang Office; and the Professional Image Computer.

The plan didn't work. The products were extensively delayed, and An Wang says now that developing

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INSIDE THE INDUSTRY

the products took longer than expected. Whatever the reason, the delays left customers in limbo, points out John McCarthy, an analyst at Forrester Research Inc., in Cambridge, Mass., and a former Wang marketing analyst. "There was a real lull in activity. And as time went on, Wang was missing a series of deadlines."

The company was furthered burdened with a growing bureaucracy that hampered the delivery of service and delayed orders of the data processing systems it did have—orders that often were intended for MIS directors, who were accustomed to the red-carpet treatment they received from a competitor. "IBM has made its reputation with support. You pay through the nose for it, but it's there," reports Clement Kichuk, vice president of MIS at Marketing Corp. of America, a Wang user in Westport, Conn. "With Wang, we're on the bleeding edge all the time. It's a matter of their rapid growth and not having as many people in the field as they need."

At roughly the same time—the early 1980s—two of Wang's major competitors in the office systems market had made a successful transition from technical computing to supplying full-fledged office systems. Data General's Comprehensive Electronic Office and Digital Equipment's All-In-1 began to woo customers away from Wang. Then, in the fall of 1984, IBM's new comprehensive office strategy that revolved around the System/36 minicomputer threatened to do the same. Although many of the components of the IBM plan consisted of projected, not actual, products, the simple promise of an IBM office system was enough to delay purchases until potential buyers could see what IBM was going to come up with.

Finally, the entire computer industry went spinning into a recession that started late in 1984 and continued through 1985. New orders slowed down to a trickle, and revenue could not support the overhead Wang Labs had taken on in its growth years. The financial crunch culminated in last spring's loss of $109 million. The result was a shakeup, which continues to this day, which began with the resignation last summer of John Cunningham, the president An Wang had recruited to help take command of the company's marketing efforts.

By that time, An Wang had delegat-

ed a great deal of authority to Cunningham, to his son Fred, and to J. Carl Masi Jr., the executive vice president of sales and marketing, who resigned last month. When the financial crunch began, however, the founder, who had left the day-to-day running of the company to others, returned to lend his touch to the business operations. The news that "The Doctor," as Wang's 30,000 employees refer to him, was returning helped restore some morale. It also reassured, to an extent, the nervous investors on Wall Street who could provide or withhold capital.

An Wang has begun to take action. Some of his moves are more or less symbolic. For example, he has begun to appear in the company's advertising, and he has gone on the road to reassure the firm's major users that it has direction. He has also taken steps within the company to reassert his control: Wang's top three marketing executives now report directly to him, rather than through the executive vice president of sales and marketing.

Another effect of An Wang's stepped-up activity is that it has, at least temporarily, put to rest the issue of whether Fred will succeed him. The elder Wang claims that for the time being the question is moot: "There's no understanding between him and me. I will continue to run the company as long as I enjoy it and my health holds up."

The Doctor has a lot of work to do.
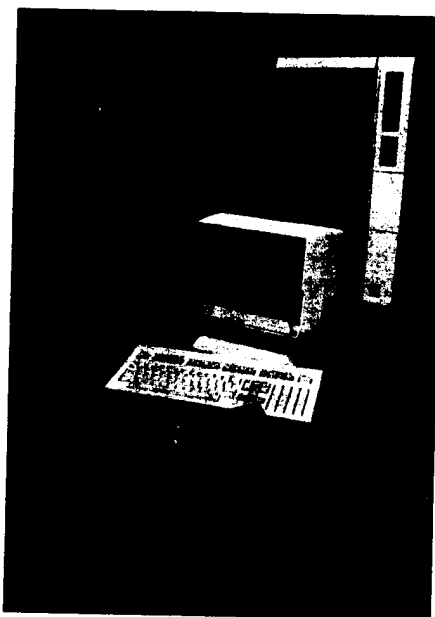
Users faulted not Wang's integrated office solution itself, but the lack of support

Orders for the VS 300, the company's most powerful processor and the box it's counting on to make big profits, are trickling, not rushing, in. Only about 250 have been installed to date, and the machine has suffered from operating system problems in a dozen user shops since deliveries began a year ago. At the same time, DEC claims to have shipped more than 2,000 of its comparable VAX 8600s and 8650s. (It should be noted that DEC, with its stronghold among technical users, sells to a far wider range of customers than Wang does.) Sales of the VS 15, 65, and the new 5 and 6 have been brisker, but the smaller machines earn much less money on each sale than the high-end VS 300.

The most recent sign of Wang's difficulties appeared just last month, when Masi resigned. Apparently unhappy with the company's marketing direction, An Wang had asked Masi to take another position in the company—overseeing Wang's joint venture investments. Masi quit rather than take the new job. He will say only that "There was a period of frustration that I don't want to go into in any detail."

Wang is not, however, without resources, chief among them a large body of customers who tend to stick with the company, sometimes against their better judgment. "Almost all VS users have a love-hate relationship with Wang," explains Louis Giglio, an analyst at Bear, Stearns & Co., in New York, which recently completed a survey of large-scale Wang users. "Everyone is having problems with Wang to some degree, and they seem more prevalent than with other systems. Yet the Wang community is overall satisfied with the equipment."

Just how long that satisfaction will last is open to question, however. According to the PaineWebber survey, only one out of the 19 customers polled expected to raise his spending on Wang equipment by more than 15% a year. Twelve of them actually saw a net reduction in the value of their annual Wang outlays.

The predominant reason for customer dissatisfaction seems to be not the equipment itself, but service and support for it. Max Hughes, who runs the information center at Pfizer Pharmaceuticals, in New York, notes that although that service is rapidly improving, in the past the company was "slow to fix a problem, and acrimon-

INSIDE THE INDUSTRY

The Wang Whose Working,

One issue An Wang doesn't like to talk about, at least publicly, cuts to the core of the company's future. That question is: Who will lead Wang Laboratories after "The Doctor" steps down?

Wang claims he hasn't made a decision. He also says he doesn't have to as long as he's in charge and healthy. Others, however, think his mind is already made up. They think The Doctor wants to keep the management in the family, and that means his position will be taken by his eldest son, Frederick A. Wang. "I certainly think Fred has the inside track," says J. Carl Masi Jr., who was Wang's top sales and marketing executive until his departure last month. John Cunningham, former Wang president and now chief executive at Computer Consoles Inc., agrees, "I think Dr. Wang would like Fred to run the place." But An Wang won't turn over the reins, Cunningham predicts, until he is confident that his son is ready.

Fred Wang is now 35 years old, but whether he is ready to take over

is hotly debated both inside and outside the firm. Those who know him say he is impulsive by nature and occasionally hot tempered.

Nevertheless, the younger Wang's history with the company indicates he is being groomed to lead it. Since the late 1970s, he has helped run research and development, manufacturing, and finance. Currently, he is Wang's third-ranking

officer as executive vice president and treasurer.

After graduating from Brown University with a degree in mathematics, Fred Wang went to work for his father in 1972 as a programmer on the 8000 project, which eventually produced the VS series of processors. He switched to marketing in 1974 and became director of office systems marketing two years later, at a time when word processing sales were booming.

In 1980, young Wang took over research and development. It was then that he urged the company to make its bold pronouncement of October 1983—the unveiling of 14 products that were scheduled to hit the market the following May. Those products, which included the Pace relational data-base management system, the Wang Office for the VS, and the Professional Image Computer, arrived much later. As a result, Fred Wang's credibility suffered. "I didn't get good information on some of the dates, I think partly because the understanding of the complexity

Executive v.p. Fred Wang may or may not succeed his father at Wang Labs

ious about whose fault it was."

"Overall, I've been very satisfied with Wang," says Ed Johnson, manager of minicomputer systems at Amerifirst Federal Savings, in Miami. "I've been less satisfied on the service side. The biggest thing is they're stretched too thin."

Jon Kropper, Wang's top manufacturing executive until he left to become president of Hadco Corp., a Salem, N.H., electronics maker, advises Wang to "keep working hard on customer service. I think the iron works very well, but you have to have the bugs worked out of invoicing, delivery, and so on."

According to An Wang, the company is taking steps to improve service to customers, as well as communications both with them and within the company. "I have reduced a lot of layers both here and in the field so that the communication is improved," An Wang points out. "We built so many layers of management."

One major effort is a $1 million private television network, which began broadcasting in December. Beamed to

satellite dishes at 67 Wang facilities, the programming is aimed at training sales and support people and then users. Wang also intends to use the network to make product announcements to its customers. The project draws the approval of Masi, who says, "The biggest single problem we had was communications. This allows them to have direct communication with Wang personnel and with customers, without any levels in between."

The firm also has high hopes for two joint ventures with two technology companies, InteCom Inc. and Telenova Inc. With InteCom, Wang is developing a voice-data workstation to be integrated with private branch exchanges. With Telenova, it is working to develop a PBX.

Those are long-term projects. In the short-term, this summer Wang will probably introduce the VS 200, a processor that fits between its 3.3-MIPS VS 300 and 1.3-MIPS VS 100. More powerful processors, or combinations of processors, also will be added at the high end of the VS line. By next summer, a 5-MIPS dual-processor is like-

ly, along with the capability to cluster multiple VS machines. The cluster probably will accommodate at least four VS 300 processors.

The point of all these projects is to establish a place for Wang equipment within larger corporate data processing systems. Essentially, the company intends its processors to fit into the middle of the corporate system, communicating with IBM mainframes above it and personal computers, linked on a Wang network, below it. To do that, the company must move quickly: Right now, IBM has no single system that connects large-scale mainframes, midrange office and departmental systems, and low-end personal computers. Instead, it has several midrange systems, few of them compatible with any of the others and several of them incompatible with either mainframes or personal computers.

But how long IBM will allow that situation to continue is anybody's guess. Many analysts think it won't be long. A working midrange system is coming soon, according to Jack Walsh, president of Integrated Strategies Inc.,

May 5, 1986

INSIDE THE INDUSTRY

And Waiting, In The Wings

wasn't there," Fred says now. "Part of it was because some of the engineers who did know were not able to get their concerns to me or it wasn't fully understood."

That misstep notwithstanding, Fred Wang does have his supporters within Wang. Even his sharpest critics concede that his skills as a manager are improving. His advocates say he has made several difficult decisions, and made them wisely, during the last few years, which have not been an easy time for the company.

One of those decisions was the move to open up Wang's proprietary architecture to other vendors. Fred Wang and his allies initially met stiff opposition to the move. "There absolutely wasn't unanimous agreement," he reports. "But I was the one who had to sign off on it, and I was the one who had to convince our leader."

The decision Fred Wang thinks was his best was his appointment of Horace Tsiang, a low-key engineer who had been with the company since 1969, to run research and develop-

Senior v.p. Horace Tsiang is credited with developing Wang's VS processors

ment. Tsiang, now a senior vice president and Wang's chief development officer, is credited with developing the company's VS series of processors, on which Wang's future hangs. "I think that making the VS really fly has been his main accomplishment," Fred Wang says.

When the VS development effort began in the early 1970s, a team of software engineers had been dictat-

ing the direction of the product to the hardware group, according to Fred Wang. The approach led to a software-heavy system: The operating system and the rest of the software created too much overhead for the system. "What made it fly was that Horace really began to understand how the software worked, and then redid a good portion of the hardware to complement it."

On the question of Wang's future leadership, Fred Wang is as noncommital as his father. He agrees that The Doctor doesn't have to make a decision now on his successor because he's firmly in charge. If, in time, Fred Wang does take over, he believes he'll operate a little differently. "I don't think my role is to fill his shoes. You don't replace him as the innovator with another innovator," he explains. "You create a department of innovators. You don't replace him as the person with all of the goals with another person with all of the goals. You create more of an organization that can do that." —R.B.

a New York data processing consulting firm. And it will probably be in the form of a scaled-down 4300 series machine or an enhanced model of the PC AT.

An Wang, however, thinks IBM's shortcomings in the middle range will not be so easily remedied. "IBM's strength is in the mainframe area. To a certain extent they have a de facto PC standard. But they are very weak in the middle area, to link them together. Their systems are not easily compatible. They are trying to announce a set of de facto standards, but they are unwilling to spell out up front what they are trying to establish.

"IBM hasn't even decided what policy they are going to push," he continues. "They are trying to tell users to go direct from the PC to the mainframe, and yet they have the System/36, the 8100, the Series/1, and System/38, and none of them is really compatible. They are hesitating whether there should be the three-level or two-level approach."

IBM's weak points do not automatically become Wang's strong points,

though; the company must be able to take advantage of them, and there are those who doubt that it can. Kichuk, at Marketing Corp. of America, says, "They don't have enough experience as a major data processing vendor." He adds that Wang's documentation is inadequate, and that the company's sales staff often doesn't understand the full implications of the technology they're peddling. This came to the surface, he notes, during the marketing of Pace, the fourth-generation language and relational data-base management system. "Pace is a magnificent tool," acknowledges Kichuk, "but the marketing you see for it is usually simplistic. The impression you get is, 'Here's this thing, you plunk down the money, take it home, and it's up and running.'"

Wang cannot afford such an attitude now that it is dealing in full-fledged computer systems. When the company sold only standalone word processors, which are relatively easy to install and simple to operate, its end users did not require extensive support. Today, the requirements are

more complicated. Wang must continue to provide users in the office with the kind of products they have come to expect from the firm. However, Wang must also learn to work with DP departments, which need far greater support, if its systems are to win a place in large-scale installations.

An Wang recognizes this. "Essentially, we have two clienteles," he says. "There are MIS managers, whom we want to feel comfortable about us, that we have an integration scheme, the ability to coexist with the mainframe and other machines. And there are end users. We're working with MIS to help the users develop the applications they're going to run."

Learning to support two user categories is just one of Wang's tasks. It must learn to operate in the world of MIS while maintaining its position with office workers. An Wang knows what he has to do. But that doesn't mean he and his company will be able to do it. And, even if they can, that they will be able to do it fast enough. As Red Auerbach might remind the Doctor, the clock is running.   —Robert Buday

2 November 1983

MEMORANDUM FOR THE RECORD

FROM: ☐ STAT
Chief, Word Processing Branch, ED/P/ODP

SUBJECT: Report on Trip to Wang Labs on
27 October 1983
STAT
STAT
STAT

1. On 27 October 1983, ☐ , Director of Data
Processing, ☐ , Deputy Director for Processing, ☐
☐ , Chief, Engineering Division, ☐ , Chief, STAT
Systems Programming Division and ☐ , Chief of the Word
Processing Branch visited Wang Laboratories, Inc. in Lowell, STAT
Massachusetts to discuss Wang's Corporate Strategic Plans for
multifunctional workstations, networking and emerging office STAT
technologies. Agency personnel also discussed Agency strategic
plans in these areas. Wang attendees included Sam Gagliano,
Vice-President of Product Marketing, Jon Addleston, Vice-President
of Office Systems Development, Bruce Hurwitz, Vice-President of
Systems Development, Eugene Shugoll, Vice-President of the Federal
Systems Division and others.

2. ☐ spoke about the IBM mainframe environment STAT
within the Agency and the requirement to integrate all future data
processing capabilities, such as work stations, voice and facsimile,
into this environment. A roundtable discussion on strategic
planning revealed that both organizations seem headed in similar
directions in many areas. However, Agency personnel pointed out
that the Agency has some very specific requirements with regard to
future multifunctional work stations. Wang suggested that follow-on
discussions be held with Agency and Wang technical personnel to
address Agency requirements in these areas. The first such meeting
was scheduled for 15 November 1983 at Wang in Lowell, Massachusetts.

3. A presentation and demonstration of the Wang Professional
Image Computer (PIC) was given by Bob Whyte of Wang Labs. The image
scanner, used for digitizing input documents, was demonstrated on
memoranda, maps and newspaper segments. Page layout composition was
demonstrated, integrating both images and text on the same page.
The PIC Notebook capability, with its associated image data, was
demonstrated using a real estate application which stored notes of
text on houses for sale and associated images of the houses and
floor plans. The integration of image and data processing was
demonstrated by digitizing a form, displaying the form on the
screen, and retrieving and editing stored data to the form.

4. Phil Thomas of Wang Labs provided a TEMPEST Update discussing the Wang PC, Wang Fiber Optic products, the Wang VS/85 minicomputer, repackaging of the Alliance disk drives and laser printers.

5. Aaron Zornes of Wang Labs led a discussion on data base management for the Wang VS Systems and futuristic plans for a distributed data base machine. MANTIS, a fourth generation language which runs on IBM mainframes, will be developed for usage on the Wang VS by the summer of 1984. MANTIS will be used in conjunction with TOTAL on the Wang VS for reporting and relational queries. PACE, a relational data base management system, will be developed to interface with the Wang VS DMS (Data Management System) files. The data base management system, FOCUS, will be adapted to the Wang PC.
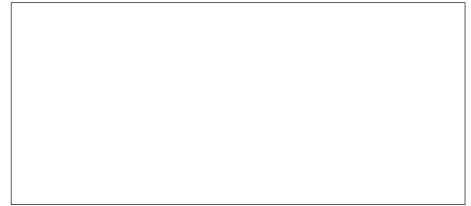
STAT

17 November 1983

MEMORANDUM FOR THE RECORD

SUBJECT: Trip Report - 15 November 1983

1. A meeting between WANG and Agency personnel occurred in Lowell, Mass. on 15 November 1983 to discuss the Office of Data Processing's next generation work station and related communications network architecture needs. The list of participants and the formal agenda is attached.

2. The meeting commenced with a brief overview of the Agency's activities to promulgate the SAFE tri-level architecture over ODP's services, including the proposed DO Upgrade. This architecture embodies MVS back-end(s), running large applications including batch, DBMS, and cable dissemination services; VM front-ends(s) supporting user interactive facilities that manage the multiple activities (tasks or contexts) that a user has initiated; (these two environments are to be interconnected by IBM 3088 technology and software, some of which is being developed by ODP); and an intelligent work-station that will be personal-computer based, in its next generation. (The current generation work-station is the Delta Data 7260 (and functionally equivalent 8260) which will be connected to the VM front-ends by dedicated, twisted-wire circuits, using NCR COMTEN front-end processors. ODP's pre-SAFE structures, which use primarily IBM 308X computers, is quite similar except that services in the MVS environments are directly accessed, and are not integrated with the VM environment. The VM environment currently supports ODP's electronic mail package called AIM. Additionally, a prototype full screen editor Host Based Word Processor (HBWP), which exploits the DD8260, is available. As part of this evolving architecture, with new text and non-text services, and with the prospect of a new building on the Agency campus, it is expected that the communications network supporting the terminals will also evolve, probably encompassing LAN characteristics.

3. An implication of the back-end service switching of the SAFE architecture is that it changes the switching characteristics needed for the terminal/work-station switching network. It is hoped that the next generation communications architecture can be based on a more commercially accepted, IBM compatible, approach, perhaps utilizing IBM 3270 protocols, for example.

SUBJECT: Trip Report - 15 November 1983

4. Presently, the dedicated circuit network uses asynchronous communications with an Agency developed block-oriented protocol called CAM (Conversational Access Method) overlayed onto it. This protocol is nearly independent of the specific implementation of the DD 7260/8260, assures a set of functional capabilities in the work-station, and provides host control of the terminal. CAM resides in VM (and MVS) and allows an application to present formatted data to the terminal, manages presentation of data at the terminal, and can control terminal operator keyboard functions.

5. Host control of the work-station, using CAM or its equivalent, is desired, with the CAM commands, perhaps, encapsulated in a more standard protocol, such as 3270. The CAM (or CAM-like) commands would be interpreted in the work-station. Performance issues related to the (large) protocol envelope would still have to be addressed.

6. The CAM facility helps to support forms-fill activities, supported by inherent Delta Data capabilities. These terminals supported facilities include multiple page forms, field validations, required fields, sub-fields, variable length fields, highlighting, bold, blink, underline, etc.

7. The Delta Data terminal provides a set of word processing primitives that have been used in the implementation of the HBWP prototype. It is hoped that the next generation work-station will provide word processing in the work-station and not in the host.

8. The terminal provides and the work-stations should support presentation of at least 28 lines, although a full-page display (66 lines) is desired. True vertical scrolling is supported now. Horizontal scrolling would be a desirable feature in the next generation device. A related approach, but not functionally equivalent, would be the ability to display more than 80 characters on a line.

9. The terminal provides extensive support to split/window management. These capabilities have, as their logical extension, the capabilities found in the Xerox/Apple (Lisa) technology. Each Delta Data split/window is supported by its own cursor and tab control. In the development of the Delta Data, the major development difficulty involved memory management in supporting splits. The logical extension of split management, which presents a consistent user view of the users' activities and which integrates context management within the host front-end and the work-station, is an objective.

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SUBJECT: Trip Report - 15 November 1983

10.   While mode switching (i.e.. PC operation, word processing, terminal/host interaction) is an approach, the objective still is to obtain a transparent of the modes to the user.   Insight into this "user transparency" can be obtained by examining the "virtual scrolling" facility in the Delta Data and the implementation of the VM/370 IBM PC-XT variant, most notably, the "virtual services interface".   Virtual scrolling (i.e. host-supported scrolling) could be effected by use of the "scroll" key.   Local vs host-supported scrolling would be transparent to the user.   The IBM virtual services interface can make a disk write (local vs write to the host) transparent to the user.   The main idea is that the user is not aware of actions performed by the workstation as opposed to actions performed by the host either at request of the workstation or by command of the host.

11.   Additional network issues include the desire to have "diskless" work-stations by using "file server" capabilities in a sub-network (i.e. a cluster of work-stations), perhaps, with this file server associated with the gateway to a backbone network (which connects to the host).   It would be desirable to have interfaces from WANG communication facilities to IBM hosts that operate at IBM host channel speeds (2.5 - 3 Mbs).   It would be desirable to down-line load alternate character sets to the work-stations.   Also, there is a need to support 'who are you', 'what are you', and 'where are you' control characters.

12.   In the afternoon, WANG reviewed its WANGNET family of products, which are described in the referenced data sheets.   It was observed that an interconnection of PERIPHERAL Band and PC Band facilities is an approach to the type of WANG communications/IBM host desired, although fewer protocol conversions (WANG to IBM to WANG to IBM) would be preferable.   At the host end, connection to IBM 3274's was identified.   Since Wang has a capability to provide 327X support on the PERIPHERAL Band, it might be possible to provide a 3274 interface, without first emulating a 3278, by modifying Wang's device concentrator.   Connecting to IBM 3274 would not be best when connecting the number of work-stations the Agency intends to support _____. WANG indicated that the full WANGNET   STAT spectrum (390 MHz) could be allocated to a single service thus supporting more work- stations in a WANGNET Band.   The Agency suggested that a VS based, front-end processor, that emulates 3274 (but in larger numbers) might be an extension to the WANG networking products in order to support larger networks. Similarly subnetwork gateways/file servers could be VS based.

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13. WANG discussed some of its futures relative to its networking products. These included: prefabricated coax media segments (including amplifiers) to reduce cable plant installation costs, support to IEEE LAN standards 802.3 and 802.5 and IEEE 488 standard, T1 service (PBX), 19.2 Kbs (on the INTERCONNECT Band-?), encryption (DES applied to WANGBAND, INTERCONNECT Band, and PERIPHERAL Band, in that order) and a TAC/IRMA board equivalent for 3270 support in the WANG PC.

14. Discussions also confirmed the Agency interests in monochromatic, medium resolution graphics (PIC services and the like as extension to) the Xerox technology (dynamic, overlapping windowing). It would be desirable to have character interpreted (OCR) of PIC image scanned documents. Color graphics would be used in no more than 10% of the work-stations. It was recognized that these facilities would have major implications for the communication network architecture. "Mice" are desirable devices, light pens are not. The only likely peripheral for a work-station would be a letter quality printer, although this would not be a likely configuration given ODP's plans for distributed, cut paper, laser printing (e.g. XEROX 2700's or the equivalent). A few, specialized, input devices, for a work-station might be desired.

15. Having provided WANG with Delta Data 7260/8260 functional description documents and CAM manuals, we closed the discussion on the possibility of Delta Data "emulation" (mode) in a WANG PC.

STAT

Chief, Engineering Division/P/ODP ODP

Attachment:
as stated

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