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I am going to run through this much faster than I had anticipated. I am going to give you the background of an HP3000 application in an environment that I think is foreign to most of you, a jail. In fact, the largest single correctional facility in the world, Cook County Jail.

The system we are going to talk about is called CIMIS--the Correctional Institution Management Information System. It is a decision making tool that will be used by everybody from the warden, for making major policy decisions, down to the line officers who make the thousands of decisions every day controlling population movement.

The system accomplishes this through a series of data base inquiries and modifications called transactions. This raises the first topic that should be of general interest to you. We are going to talk today about transaction processing on the 3000. We never intended to put 192 terminals on the system, but Gary Green liked that number so much that he included it as the title of our talk. You are going to find out later that you could have 192 terminals on a 3000, or even more, depending upon the environment in which you are processing transactions. We will have a minimum of 41 terminals on-line simultaneously, growing to between 60 and 70 by December of 1977.

One of the major things we are going to try to do here this afternoon is make sure you understand what we are talking about when we say "transaction processing". Alan Dale is going to deal with that in a general sense which, I think, will be most interesting to many of you.

I am going to give you an example of one specific type of processing that we are going to do on the 3000 to use as a benchmark for conceptualizing potential uses for this technique in your own shops. I am going to begin by explaining, very rapidly, why we are doing this and how we evolved to the 3000 and the SRI front end/message control system to be described in a minute.

In the fall of 1973, two events occurred that placed us on the road that lead here today. Firstly, a new administration came into Illinois after the 1972 elections. They had just completed a period of transition and familiarization with the headaches that they had inherited in state government. They had their set of goals and objectives upon which they had campaigned and more than a full measure of problems and frustrations particularly in the area of criminal justice.

The second event was that David Coldren and myself were just finishing working on a \$2 million U.S. Department of Labor program to improve the quality of services, particularly manpower services, in the State's correctional institutions.

Dave described our emphasis in Illinois on operationalizing justice. To reiterate, that means trying to achieve equal treatment in the criminal justice system, making decisions based on fact, on the record, and subject to review. That is the Justice Model.

The experience that Dave and I had in corrections indicated that in this particular criminal justice system component, decision makers were not receiving the kind of information that supported good decision making in terms of what we thought justice model objectives should be. Dave and I suggested an information system be developed and made available to the widest possible audience in the custodial environment with the emphasis on line staff and their decisions affecting living locations, work assignments, disciplinary actions, and the like. In custodial environments, such issues are critically important as evidenced by demand lists presented by inmate groups involved in prison disturbances before and after Attica.

Yesterday, with groups of users cheering them on, a few people suggested that HP misrepresented the number of users that could be adequately supported on a 3000. We will have over 40 initially, as I said, and it is ambitious task. But, it wasn't the first thing we tried to do.

In the first effort, we wanted to determine if it was possible to implement anything that involved line staff directly in an information system targeted toward decision making. Line staff in a major Illinois penitentiary reported entry, exit, assignment, and housing changes to a three-person CIMIS staff who updated a system of files that constituted an end-of-day picture of the institution, that is what it would look like the first thing in the morning when they unlocked the doors. We called this the "snapshot approach". From these files, reports were generated at night and distributed to staff the following morning. Our objective was to give line decision makers all relevant information that related to their particular areas of concern. For example, the housing committee at Stateville Penitentiary had a complete housing map that was produced daily. They used this to balance the population across cell houses while considering issues of security and specific inmate proximity.

This "snapshot approach" operated effectively, but at significant dollar cost, with data base changes formatted off-line through an intelligent terminal and processed in batch through the resources of a service bureau. This is the schematic (slide) of the computers that were used at the McDonald-Douglas Automation Company. Access was, at this point, limited only to CIMIS personnel and the update cycle occurred once daily.

In our second effort, we sought to maintain more than the most recent "snapshot" of the institution so that the top management could periodically review the decision processes of line staff. A monthly management review cycle was implemented in which a series of "snapshots" were retained in a "photo album model" via the use of a mini computer in a transaction processing environment. This environment, which I might add, effected a 90% cost savings in data processing charges vis a vis the service bureau, used screen formats to access and edit online records of any particular inmate. The primary role of the system, however, remained that of disseminating information to the decision makers through daily hardcopy reports.

In the initial mini-computer configuration, access continued to be restricted to CIMIS staff while updates throughout the day were made possible at a marginal cost of zero. The once daily report cycle prevailed for some time. We used IV-Phase System IV/70 hardware, and these systems are still in place in two Illinois institutions.

The next step in the evolution was to change the role of the system from that of an institutional mirror to the operational control mechanism that we had always intended it to be. With CIMIS, by this time a proven product, the institutional managers took the next step of placing terminals in a control center environment so that all decisions effecting housing and assignments were cleared through CIMIS before actually being implemented. A cycle of daily movement, planning, and control began to take shape. The concept of planning in a correctional institution was unheard of to this point. No longer was access limited to system staff. Rather, line staff maintained up-to-date files from a single control center throughout the day. For example, at Menard Penitentiary the security shifts do not change until the institutional headcount, by gallery, is reconciled with the headcount in CIMIS. Since the guards in Illinois are unionized, that constitutes about 300 people being paid time-and-a-half while awaiting shift change. Additionally, officers become extremely irritated when required to stay after completing their eight hour shift. The cost of bad information in the system became significantly greater.

Retaining the thirty day management review capability (the "photo album model" that I showed you earlier), file updates began to occur with increased frequency edging the CIMIS system into what we call the "moving picture model" of institutional status in which hundreds of "snapshots" of the institution are recorded each day yielding a dynamic picture of institutional movement and decision making.

That is our history.

It brings us to the status of CIMIS currently under development on the 3000, real time inmate tracking in the Cook County Department of Corrections. Remember, in our parlance tracking is defined as the thousands of population control decisions made daily in an institution, the analysis of which forms the basis for all management decision making. Far removed from the active, but fairly stable environment of a penitentiary, the Cook County Department of Corrections is perhaps the most fluid correctional population anywhere in the United States. We have 60,000 people booked annually, many of them every Friday night. We have about 400 people going to court every day. We have an average daily population of 6,000. Now you might say, New York has more people than that in jail, and they do. But, they have eleven facilities spread all over the five burroughs. All of the facilities I will show you in a moment are on a contiguous fifty-six acre site. We have substantial scheduled movement to work assignments and court (since a jail is primarily a warehouse for court in which ninety percent of the 6,000 inmates are unsentenced). We also have significant unscheduled movement such as, lawyer visits, family visits, and the like.

In the summer of 1975, a rash of escapes at the Cook County Department of Corrections prompted investigations by the Sherriff's Office, the press, and citizen's groups, resulting in charges of inadequate population control, poor middle management, and poor administration and planning. Our agency was called in and responded with a package of five managemet support programs, ranging from an internal affairs division to a middle management development program, with the keystone in the program package being CIMIS. I want you to make no mistake, as you might begin to think that perhaps we should be locked up, we embarked upon this project in an atmosphere of crisis. In Chlcago today, the only person whose picture appears in the paper more than Mayor Daley or Snoopy is the Director of the Cook County Department of Corrections. The Department is a "hot" issue.

Given the success of the penitentiary based CIMIS, and given the R&D role of ILEC/CJIS described earlier, we were given the task of tailoring the CIMIS system to the Cook County Department of Corrections. Specifically, we were told, track inmates real time, produce periodic and on demand management reports, and monitor staff adherence to procedures. This last point is particularly important as it is a direct reflection of decision making, and it was both the major criticism and defense of the operation of the Department of Corrections. Critics claimed no, or at best, vague procedures existed to guide staff in their decision making, and the administration claimed that it could not adequately monitor staff adherence to its established procedures.

The Cook County Department of Corrections, as I have shown, is composed of five contiguous divisions distributed over a fifty-six-acre site. The numbers on the slide refer to the different divisions. The first being a male division, maximum security, bonds of \$5,000 and up. Division number two represents a male a division for less serious offenses with bonds below \$5,000. Division three is women. Division four is a new work release center and an overflow area for division one. The three crosshatched areas (slide) represent buildings now under construction that will add another 1800 beds by December 1977. This is our growth requirement for terminals. Each division is separately administered but all report to the director of the department who is located onsite.

To develop the notion of inmate tracking as a transaction process on the 3000, and to hopefully make the general description of the message control system more meaningful, I would like to present a simple illustration of a CIMIS transaction on the 3000. To do this I have to define three terms.

The first is sphere of control. Paradoxically, the more narrow the sphere of control in a custodial environment, the safer the inmates, thus enhancing the freedom you can have in the atmosphere of confinement. There is simply no justice if a correctional institution is less safe than the most dangerous street corner in Chicago or the Baltimore Hilton. Examples of spheres of control at CCDOC are a tier (sixty cells and a day room through which inmates can move during the day), or work assignments, like the bakery, in which the supervisor has the responsibility for a crew of inmates. A sphere of control is an area in which inmate movement options are limited, but not totally restricted, and in which specific line staff members or a single member have custodial responsibility.

two or more spheres of control. These points imply a change in sphere of control with, and this is very important, rules or procedures to govern such changes, personnel authorized to make such changes, and a given line staff member to carry them out. An example might be moving an inmate from his tier to the dispensary past certain check points. When an inmate passes an accountability point, his location and status are altered in the CIMIS files, which are maintained in an IMAGE data base.

The final term is administrative area. These are primarily records offices which effect changes in the inmate's status by scheduling court appearances, recording changes in bond, and the like.

Our analysis of the Department of Corrections' spheres of control, accountability points, and administrative areas led to the terminal configuration shown on the slide. You see forty-one "T's" with the numbers indicating the level above ground. You will note no terminals are shown in the three buildings still under construction. It has not yet been made clear as to how these facilities will be administered and operated.

As I said before, the jail is a warehouse for the courts. Now I am going to illustrate two transactions that are going to be typical in CIMIS, relating to the daily court call process.

Each morning, men are "dropped" in accordance with the scheduled court call from cell blocks that are composed of four tiers connected by a stairway that runs into a subterranean level called "boulevard". There is no other route off these tiers. "Dropping" simply refers to moving the men from the tiers to the "boulevard". A "boulevard" officer calls for a single cell block at a time for one of two holding areas. The first holding area is for the criminal courts building which is connected to the jail by a tunnel. The second, since we are a centralized holding facility for the whole county, is used for men awaiting vehicles for transportation to suburban or downtown courts. For example, if ten inmates from A Block are to be dropped to the suburban holding area for transportation to the suburbs, the boulevard officer at this post will type on his terminal, "/Drop, A,S". That means that he is going to drop A Block to the suburban holding area. This transaction does a variety of things. First of all, it records that all ten of those inmates are no longer on the tier. They moved from one sphere of control to another. Secondly, it indicates that an action was taken in accordance with a schedule that was made up the night before. The third parameter "S" it indicates that they are going to the suburban holding area.

turned over to transportation units that may service as many as ten suburban branch courts. Thus, by entering "/Dispatch, Court Code 1, Court Code 2, ..., Court Code 10" the holding area officer will record that the inmate is being transferred to the custody of an external authority. When he types this transaction a format comes to the screen. He will type in the badge number of the transportation officer who is also signing for the inmates that he is taking. In addition, the system will record that a dispatch was made in accordance with the schedule, and record the departure of a group of inmates from the global sphere of control of the department. One note about jails and judges, you are dealing with separate administrations. If we send those ten people to court in the morning, we don't know who will be coming back because an individual could be in jail this morning with a \$1 million bond for five counts of murder, and he could go into court and have the charges dropped. Therefore, he doesn't get transported back in custody like somebody who is still under indictment. He goes home. You never know who is coming back when you send inmates to court.

These transactions are, of course, simplified. They use the IMAGE data base sub-system. Multiple data base accesses are associated with both transactions and this, far more than the number of different terminals talking to the 3000, is the limiting factor in our systems' performance.

Upon completing our analysis of the system at the Cook County Department of Corrections, RFP's were let with the specifications shown in summary on the slide. I won't read them all, but HP could meet all but the first, "62 simultaneous terminals as a minimum". Our options included: 1) Trying fewer terminals. We went back and took a look, but fewer terminals would have diluted the spheres of control so far that they would not have been productive. In addition, there would be no growth potential to accommodate the new buildings. 2) HP could offer no solutions, save many dial up terminals within the 32 simultaneous terminal limit. Given an extremely unsophisticated users group, guards, and an environment often referred to pre-twentieth century, this was unacceptable. We had neither the in-house expertise nor the time to develop our own front end. Therefore, we looked for vendors (option 3). One was Westinghouse Learning Corporation. They were talking about building a transaction processing front end to a 3000 but they were a couple of years away. There was a Canadian firm as well, the name I don't even remember, who wasn't even sure they would proceed with the project, and there was a company called Systems Research, Inc. (SRI). We decided, based upon what we saw being developed on a 21 MX, a front end and message control system, that we would go with the 3000 with a 90 day no-penalty cancellation clause. This was

and see what would happen. At the conclusion of the 90 day period we faced a decision. SRI was developing a 21 MX front end to a 21 MX transaction processing system for a medical application. Secondly, SRI had experience that they could demonstrate in writing other transaction processing systems, and, of critical importance, after three months of playing with the Skokie HP Sales Office's 3000, (when it was up) we realized that the number of terminals was not a terribly difficult hurdle to surmount. Rather, process control and message control within the 3000 were more critical. SRI was modifying software that they had developed for a Burroughs' system to control messages internally. Unfortunately, by the time the 90th day came along, and it went to day 90 before we said "go", SRI was only able to demonstrate a small portion of the interface between the front end and the 3000. We basically took a calculated gamble on SRI.

The results have been a structure for coding that have permitted four programmers, totally inexperienced in transaction processing, to write independent transaction modules in two to three weeks per transaction with that time frame decreasing rapidly. SRI, unfortunately, hit a dead end here and there that delayed implementation, but, this was not unexpected. HP is not quite as predictable; we found that once in a while MPE or, worse yet COBOL, sticks up its head and goes "surprise!".

We know right now, for example, that if we don't get our hands on COBOL C pretty soon, we will be in serious trouble due to symbol table overflow. However, right now we are confident that CIMIS in the Cook County Department of Corrections is going to be a reality, and that you can do transaction processing on a 3000, (even on an MX) with a lot of terminals, by using some common sense in writing the code and by -using the SRI front end-message control system. Depending upon your application, you can probably do it too, with even as many as 192 terminals.

Before I introduce the message control wizard, Alan Dale, let me say that we are so confident, that we have ordered two 3000 Series II's that will provide a much more elegant, efficient, and trouble free transaction processing environment to be used in the Illinois State Department of Corrections with a network of 21 MX front ends.

I am going to let Alan Dale tell you generally how this message control system works and how you can perhaps apply it to your application.