

Why Go to Goal Mode?

One of the most frequent questions I'm asked these days is "do I need to go to goal mode?". A variation of that is "why should I go to goal mode? I need to justify it to my management." I hope this article will help.

As more facilities are introduced to OS/390 which require goal mode, I'm surprised to see that many sites have not yet made their migration to goal mode. I think it's time to review the benefits you can expect from goal mode, how long it takes to migrate, and what problems sites encounter when going to goal mode.

Survey

To prepare for this article, I sent a survey to 3700 of our Cheryl's List subscribers. We received 190 responses. 57% are running goal mode on at least one system, so we are able to see what type of success they've had.

I'll include my observations about the survey results in this article, but you can find all of the results in Cheryl's List #33 at <<http://www.watsonwalker.com/archives.html>>.

Benefits

10 Reasons to Go to Goal Mode

As you can see from the results of the survey in the next section, there are many benefits of going to goal mode. Here are the most important in descending sequence, according to the survey results:

1. **Easier Management** - Most people find that setting response goals is far easier than trying to

guess the appropriate dispatch priorities and storage isolation. People like the fact that goals can be set using understandable business requirements. Management of service policies is easier than management of IPS and ICS members.

Prior to goal mode, you had two primary control mechanisms: dispatch priority and storage isolation. But you had to know ahead of time which workloads would need extra priority or storage. WLM in goal mode can identify those needs dynamically, while the problem is occurring, rather than depending on someone to discover the problem after the fact. Also, the ability to specify a response time goal which shouldn't be exceeded gives you a very powerful, very easy method of specifying your requirements. Changing dispatch priorities was often a 'try and see' type of technique.

2. **Better Information** - Goal mode provides much more information on why workloads are being delayed. For example, if you aren't able to achieve sub-second response in CICS, you can tell from WLM statistics whether the problem is due to CPU, storage, I/O, or higher importance work. I believe this is the most significant reason to move to goal mode.

I personally would go to goal mode just for the improved reporting and statistics available!

3. **Improved Throughput** - Most every site who has gone to goal mode finds that their batch workloads get better throughput. WLM tends to drive the system much harder than you might have using your IPS and ICS. The ability of WLM to adjust working set sizes and dispatch priorities dynamically allows more work to complete on the system. Most people are surprised (and happy) to find that WLM can respond so quickly to spikes of unexpected workload activity.

4. **Improved and Consistent Response Times** - A common benefit of goal mode is improved online response times for CICS, IMS, and TSO. An unexpected benefit for most sites is the improvement in consistency and stability of response times for these workloads. Several people specifically noted that they were able to achieve higher throughput for their CICS workloads.
5. **Better Control for New Workloads** - Many of the new workloads, such as Webserver and Corba, need to respond to radical changes in capacity requirements. They require WLM goal mode as a method to manage these spikes of resource need. Therefore, using goal mode when implementing these new workloads is extremely important. We can expect more new workloads in the future to require goal mode.
6. **Improved Workload Balancing** - Most sites find that WLM is better able to balance the workload across multiple systems than they could manage manually or with automation products. Batch initiator management provides a big part of that balancing, but people are also finding excellent balancing occurring with their online systems as well.
7. **Y2K Freeze** - Many sites have been waiting for the Y2K crunch to pass before going to goal mode. Since most production systems are frozen before Y2K, it might be a good time to convert your test system to goal mode. There is seldom a freeze of test systems. Converting a test system can be done in just a day or so, and you can gain experience with it during the next few months until the freeze is over.
8. **Better Management of DDF Enclaves** - DB2 complex queries that can overwhelm a machine have been a problem for many sites. WLM provides more control of these resource-consuming transactions and the ability to allow shorter transactions to run at a higher priority than the longer requests. While some of this control is available in compat mode, the full control is only available in goal mode.
9. **Better Control for Inconsistent Work** - Current work that has spikes of activity is difficult to manage and control with the IPS controls. WLM resource capping provides an excellent mechanism to either guarantee a certain amount of capacity to loved ones or to restrict resource hogs.
10. **Compat Mode Will Disappear** - IBM presenters have long been saying that the compat mode will be discontinued at some point in the future, but it wouldn't be before Y2K. Since IBM normally gives a warning of a year or two before pulling support for a facility, most people are expecting some type of announcement in 2000. Yes, you'll have plenty of time to convert, but you might as well plan it to fit on your schedule, not theirs.

What People Like About Goal Mode

People saw many different benefits of goal mode. Here are some replies from our survey when asked "what is the largest benefit that goal mode gives you?":

- **Takes less management time** than IPS/ICS and is **easier to add new work** (this was the most common response).
- **Manages the system better** than compat mode (this was the second most common response).
- **Better performance and turnaround** (this was the third most common response). This was often accompanied by a comment on better workload balancing. For one site, the night batch completed 30 to 60 minutes earlier. For other sites, the ability to maintain good online performance while still pushing batch work through the system was most important.
- **Better throughput** (as one reader says "pumps CICS transactions through"; another said that they regained 10% of the processor).
- **Provides better and more consistent response times for online transactions** (CICS, IMS, TSO).
- **Easier to understand** what's going on in the system (i.e. who is meeting goals, who is not, why they aren't).
- **Ability to specify business goals** rather than technical IPS parameters.

- **Better workload balancing.**
- **Better able to manage over-committed systems and performance spikes.**
- **Resource groups enabled enforcement of capacity for new, unknown applications.**
- **Managing many LPARs is much easier in goal mode.**
- **Standardization by using a single policy.**
- **Much better management of DDF enclaves.**
- **More flexible classification.**

Only one person responded that goal mode provided no benefit; but most people indicated multiple benefits.

Why Don't People Migrate?

There are several reasons that installations say they have not gone to goal mode. According to our survey, the primary reasons are:

- 45% - not enough staff or time
- 21% - waiting until after Y2K
- 18% - concerned about potential problems with goal mode
- 18% - see no apparent benefit
- 16% - other

1. **Not Enough Staff or Time** - This is cited by almost half the sites as the primary reason they're not in goal mode. But if we look at the survey, the average time to go to goal mode is 1 to 2 weeks. I wouldn't think that's a lot of time to expend in order to gain the benefits I described earlier. Some people said that it took only a few hours after they downloaded my Quickstart Policy before they were running goal mode on their test system. Once you have one policy working, the rest are fairly easy.

Undoubtedly, the most time-consuming part of goal mode is the effort to change reporting programs and capacity planning systems. Once a test system is in goal mode, however, you can then take your time about getting the reporting systems working well. During that time you can also learn more about goal mode.

In a later section I'll describe a neat new (and free) tool to help convert your IPS and ICS to a goal mode policy. That could shave days off your conversion effort!

2. **Waiting Until After Y2K** - Well that won't be an excuse soon. It's true that many people in the group without enough time will have more time available after year end. We expect to see a lot more sites go to goal mode during first quarter.
3. **Concern About Potential Problems** - Unfortunately, most of the experiences that make the news are negative. When a site converts to goal mode in a weekend, doesn't have any problems with it, and gets better throughput, it doesn't make any headlines or the news groups. On the other hand, when a site backs out of goal mode because of problems, everybody hears about it! I think that the scare factor is holding some sites from going to goal mode, but I also think that's it unwarranted. Like most new facilities (even though goal mode can no longer be considered 'new'), I always recommend using the latest release possible with all maintenance applied.
4. **See No Apparent Benefit** - All I can suggest is to see my list of benefits earlier in this article. I haven't found a site yet who preferred compat mode once they've successfully gone to goal mode. Goal mode is easier, gets more work through the system, and gives you more information on that work. To me, it seems like a simple decision!

What Problems Did People Have?

There are some additional considerations you want to be aware of before going to goal mode. When asked "what was the largest problem in going to goal mode?", here are the responses:

- Conversion of capacity planning and performance reports which were based on performance groups (this was the most common response and the item that takes the most time).
- Political resistance and fear of the unknown (and this was the second most common response).

- Paranoia (every problem became a goal mode issue) - another very common response.
- Operator and user training needed.
- DB2 distributed work needed fine-tuning (i.e. getting definitions for DDF correct).
- Memory and CPU thrashing (early systems SP 5; but now resolved).
- Problems with third party products (primarily for early users of goal mode; although a few people complained about the inability of BEST/1 to use report classes for modeling).
- Figuring out how to define CICS and IMS.
- Understanding WLM (classes or conferences help out here).
- Trying to merge many (sometimes 50) different IPS/ICS members into a single policy.
- Converting auto ops packages to use service classes rather than PGNs.
- Lower importance work receiving higher DP than lower importance work (resolved with PTFs).
- Didn't like maximum of 25 service class periods with non-discretionary goals.
- Amount of planning time.
- Needing to reformat couple data set with new releases (this is required only if you want to exploit new facilities).
- Determining proper velocities.

About 20% of the responses indicated that they had **NO** problems with goal mode.

More on the Gotchas

- **Reporting Programs** - Changing reporting programs seems to be the biggest problem. If you have little reporting, then this won't be the biggest stopper. If you have daily or weekly reports based on performance groups, you'll need to change them to base off service classes and report classes.

The biggest problem you'll have is converting monthly or yearly trend charts that are now based on performance groups. Installations have taken one of two approaches, with the first being weeks easier!

1. **Start fresh.** Dispense with history and start from scratch. This is especially useful when

there is no easy comparison between PGNs and service classes. I'd recommend this method if at all possible.

2. **Change programs to convert PGNs to SCs** or vice versa. Perhaps the easiest way to handle this is to ensure that there is a report class for every PGN. Then you can easily change the program to continue tracking your old PGNs, but by using report class data instead. There are a few differences with report classes, however, as described later. Check with your software vendors. Some current reporting products provide a simple way of producing trend reports with combinations of performance groups and service classes.

- **Modeling Programs** - Modeling programs, such as BEST/1 (BMC Software) and PerfMan (Information Systems Manager), require the use of performance groups and service classes rather than report groups and report classes. In compat mode this wasn't a problem because you could easily have 100 performance groups. In goal mode, however, the recommendation is that you not have more than 25 service class *periods* with non-discretionary goals. So some sites with 100 PGNs feel like they can't do modeling in goal mode. The vendors say that they do not want to use report groups or classes because the work in a report class could be non-similar work, and all of the data is not available. If you feel that it's a problem for you, please contact your vendor for suggestions.

The differences between report classes and service classes are:

1. Report classes may only be a single period, not multi-period, so you can't easily divide your TSO users into different groups and still show their multiple periods.
2. Report classes don't include goals or P.I.s. (Of course, PGNs didn't either!)
3. Report classes could combine multiple types of transactions (such as online transactions

and batch jobs). Service classes can too, but most people don't run it that way.

Migration Help

Are the reasons to go to goal mode compelling enough for you? If so, here is some help to reduce the amount of time it takes. These migration aids should be able to help you in your conversion move.

Quickstart Policy

Because there were no conversion programs available in the early days of goal mode, I proposed and wrote about a generic goal mode policy, called my Quickstart Policy. It's a policy that I believe will work in most installations, with some slight modification (e.g. defining test batch classes and the region names of your online systems).

A description of the policy can be found on our Web site at <<http://www.watsonwalker.com/qsp.html>>. I wrote the original article in 1995 and then modified it in 1999. At the time of the modification, I also created a downloadable policy that you can start with (it's at the same Web site). Over 800 people have downloaded the policy and many have said that they were running in goal mode on their test system the next day. You can too!

RMF Migration Tool

Robert Vaupel of IBM OS/390 Development was helping customers and fellow IBMers migrate to goal mode. He found that the biggest time element for many sites was entering their large ICS members into the WLM panels. It takes a LOT of time to enter a six-page ICS one line at a time into the panels.

So Robert wrote a remarkable semi-automated conversion tool to help RMF customers get to goal mode even more quickly. This Goal Mode Migration Aid is distributed as a free, "AS-IS", tool on the RMF Web site, but does not have any official sup-

port. Robert provides support as he can, although he says it hasn't been a problem keeping up.

Robert uses the CPU and Workload Activity reports generated by the RMF Postprocessor. The data is downloaded to a PC and converted to spreadsheets with the help of the RMF Spreadsheet Reporter. The Goal Mode Migration Aid tool reads the converted RMF reports in order to define initial goals for corresponding service classes. The output of the tool is a PDS that can be brought into the WLM application as a ready policy.

Remember that the RMF Spreadsheet Reporter can be used for additional analysis.

Much of the logic is based on the comments in your IPS/ICS (e.g. words like CICS, TSO, DB2, etc. in the comments trigger a specific action). Before using the tool, you'll want to take 15 minutes to clean up the comments. As Robert mentions in the instructions: "Bottom Line: The tool is not better than the comments in the IPS and ICS member. If the comments are misleading you should either re-work them before you use the tool or plan for additional time when you use the tool."

You also have plenty of time to make adjustments before creating the final policy. For example, Figure 1 shows the screens which lists the initial assignments of PGNs to service classes and lets you change assignments as you want. Figure 2 shows the resulting policy.

This tool can save you a significant amount of time. The resulting output, by the way, looks very similar to my Quickstart Policy, because Robert uses the same guidelines and recommendations (such as few service class periods, simple velocity ranges, etc.). The latest release of the tool even calculates new durations for you if you choose to change the service definition coefficients.

You can obtain the instructions and the tool (along with the downloadable RMF Spreadsheet Reporter) at <<http://www.s390.ibm.com/rmf>>. Click on Tools.

Figure 1 - Performance Group Table

1	Performance Group Table																
2	Sort		Step 4: Put Service Classes in ICS						Step 5: Create Service Policy								
3	PG	Per	Dur	Dmn	DP	DP_Val	Rules	Subsys	Workload	ServClas	RegClas	CPU%	MPL	EVL	ETrx/s	ETm	
39	100	1		10	F60	60	1	STC	(All)	CICSPRD	CICSPDR	3.27	0.99	47.7	0	0.00	
40	101	1		10	F64	64	4	STC	(Top 10...)	CICSPRD	CICSPDR	3.37	3.99	61.9	0	0.00	
41	102	1		10	F64	64	3	STC	(Custom...)	CICSPRD	CICSPDR	3.00	2.99	57.7	0	0.00	
42	103	1		10	F64	64	4	STC	ADABAS	CICSPRD	CICSPDR	14.03	2.99	62.2	0	0.00	
43	104	1		10	F63	63	1	STC	APPC	CICSPRD	CICSPDR	0.00	0.99	4.1	0	0.00	
44	120	1		10	F52	52	1	STC	BATCH	CICS	CICSREG	0.00	0.99	5.2	0	0.00	
45	121	1		10	F52	52	2	STC	DB2	CICS	CICSREG	0.07	1.99	6.2	0	0.00	
46	122	1		10	F52	52	2	STC	NOTUSED	CICS	CICSREG	0.03	0.99	17.6	0	0.00	
47	123	1		10	F52	52	4	STC	STC	CICS	CICSREG	0.30	2.99	16.5	0	0.00	
48	140	1		10	F52	52	2	STC	SYSTEM	CICSTST	CICSREG	0.00	0.99	0	0	0.00	
49	141	1		10	F52	52	4	STC	TSO	CICSTST	CICSREG	0.13	3.99	6.8	0	0.00	
50	142	1		10	F52	52	3	STC	CICS	CICSTST	CICSREG	0.03	2.99	5.5	0	0.00	
51	143	1		10	F52	52	3	STC	CICS	CICSTST	CICSREG	0.47	2.99	18.4	0	0.00	
52	144	1		10	F52	52	1	STC	CICS	CICSTST	CICSREG	0.00	0.99	5.5	0	0.00	
53	160	1		10	F50	50	1	STC	CICS	CICS	CICSREG	0.00	0.99	7.1	0	0.00	
54	161	1		10	F50	50	1	STC	CICS	CICS	CICSREG						

Figure 2 - Service Policy

1	Service Policy																
2	<< Next Step 6: Goto ICS Sheet						Adjust Service Weights and Durations										
3	Goal Definition											IPS Data			RMF Group Data		
4	Subsys	Workload	ServClass	Per	Dur	Imp	Type	[%]	Op	[secs]	TPG	TDP	SDP	SCPU	SMPL		
5	STC	SYSTEM	SYSTEM	1			System				0	99	99	2.40	18.01		
6	STC	SYSTEM	SYSSTC	1			System				30	93	88	7.17	42.59		
7	STC	SYSTEM	SYSOTHER	1			Disc						0	0.00	0		
8	JES	ADABAS	ADABAPRD	1			2 ExVel	40			360	70	70	0.37	9.99		
9	JES	ADABAS	ADABAS	1			5 ExVel	5			370	40	40	0.03	22.97		
10	JES	ADABAS	ADABATST	1			5 ExVel	5			380	40	40	0.07	27.98		
11	STC	APPC	APPC	1			1 ExVel	5			34	81	0	0.00	0		
12	M	JES	BATCH	1	20608		5 ExVel	5			583	20	20	4.90	1.69		
13	JES	BATCH	BATCH	2			Disc				583	10	10	13.00	1.04		
14	JES	BATCH	BATCHPRD	1			5 ExVel	5			550	30	30	0.60	0.43		
15	R	STC	CICS	1			3 ExVel	10			143	52	52	1.07	20.89		
16	R	STC	CICS	1			2 ExVel	60			103	64	63	23.67	11.95		
17	T	CICS	CICS	1			4 RespTime	80	<	3.00	123	52	52	0.43	8.94		
18	T	CICS	CICS	1			2 RespTime	80	<	0.50	103	64	63	23.67	11.95		
19	T	CICS	CICS	1			4 RespTime	80	<	3.00	143	52	52	0.63	11.95		
20	STC	DB2	DB2	1			3 ExVel	5			321	53	53	0.17	3.98		
21	STC	DB2	DB2PRD	1			1 ExVel	30			304	73	71	1.17	3.98		
22	STC	STC	STCLOW	1			Disc				99	30	30	0.97	18.7		
23	M	TSO	TSO	1	286		3 RespTime	80	<	0.2	499	63	63	3.70	0.75		

REXX Exec

Some people have also used a shareware REXX (provided by Sparkasse Cologne) to help them convert their ICS specs. You can find the REXX program on the USS home page at <<http://www.s390.ibm.com/oe/bpxa1ty2.html>>. Then select ICS2WLM. It's not really a conversion program, but simply an aid to help you during the conversion when you have a large ICS.

Consulting Services

Many consultants and vendors provide assistance in getting you to goal mode. There are several dozen, but I'll list three here that I've had great feedback about:

IBM Global Services at the Washington Systems Center provides three different service offerings to help you get to goal mode:

- **S390 IPS to Goal Mode Service Policy Creation** - The objective of this service is to assist the client in converting their IPS and ICS into a goal mode service policy. This takes approximately 5 to 7 days. Contact **Gary Hall** <hallg@us.ibm.com> or pager 800-759-8888, #1190326 or **Radhika Samant** <samant@us.ibm.com>.
- **S390 Goal Mode Service Policy Creation** - The objective of this service is to assist the customer in converting their IPS and ICS into a goal mode service policy. This service will include a before and after performance verification study and provides a much more comprehensive conversion. This normally takes 3 to 5 weeks. Contact Gary or Radhika above.
- **S390 Goal Mode Conversion Workshop** - This is a three day workshop, at the Washington Systems Center, where the client participates in building his service policy. Contact **Kathy Walsh** <walshk@us.ibm.com>.

Two ex-WLM designers, **Bernie Pierce** (now with Candle Corporation) and **Peter Enrico** (now with Schunk and Associates), also provide consulting help in getting to goal mode. You can reach them at the following:

Bernie_Pierce@Candle.com
peter.enrico@attglobal.net

Summary

So should you convert to goal mode? Obviously, my recommendation is that you do. It can take only a few days to create a policy to run on your test system, and then you can migrate to production when you feel comfortable with it.

Keep in mind these recommendations (either made earlier in this article or in previous newsletters):

1. Learn about goal mode. You can get this information from past TUNING Letter articles, from the description of my Quickstart Policy (and a quick checklist of creating a monoplex) on our Web site, reading the IBM WLM: Planning manual, taking a class on WLM, or attending user conference presentations on WLM.
2. Apply maintenance before starting; especially for relatively new WLM facilities, such as batch initiator management.
3. Plan for the time to change your reporting programs to use service or report classes rather than performance groups. This is the most time-consuming step.
4. Understand that you'll never be able to thoroughly test your policy on a test system first. As an example, response goals are only effective when you have a high enough volume for WLM to manage using the goals. (On my single-user P/390 system, every goal is a velocity goal because I don't generate the minimum volume of 3 transactions every 20 minutes!)

Goal Mode, continued on page 54.

Goal Mode, continued from page 20.

5. I now recommend that people start in goal mode by using velocities for their online systems (CICS and IMS) rather than transaction goals. It's much easier to convert to goal mode using velocities and you can later take the time to figure out the more difficult transaction response goals.
6. Expect that every small problem that occurs as soon as you go to goal mode will be seen as "your" fault. It will take time to show that the problem isn't a goal mode problem.
7. Get ready to **REALLY** enjoy the wealth of new data that will be available to you! ■