

Intro

ThruPut Manager AE (Automation Edition) is the only batch software solution in its class. It optimizes and automates the total z/OS JES2 batch workload, managing every job from submission to end of execution. It complements whatever job scheduler you deploy by ensuring the jobs it submits are managed as efficiently as possible throughout the batch process.

This solution addresses every point of manual intervention previously required. It overcomes the legacy of a 40-year-old design, incorporating best practices and modernizing today's dynamic and complex mainframe batch environment.

ThruPut Manager AE is a strategic product for z/OS JES2 datacenters. With it you can modernize the batch service you offer and reduce your costs to provide that service. It's an industrial strength solution for today's datacenter.

Context and Scope

ThruPut Manager AE runs in a z/OS JES2 environment. It is complementary to and designed to work with your job scheduler; however, **TM AE** is not a job scheduler. Job schedulers manage the dependencies between jobs and the order and time they should be submitted in. However, once the jobs are submitted to z/OS, the job scheduler has little further effect. This is when **TM AE** goes to work. Its influence extends from submission of a job to the end of executing that job. It makes sure the jobs are processed efficiently, automatically reacting to processing shortages and other problems as they arise. Further, **TM AE** has influence over the entire batch workload. Accordingly, it is able to minimize any interference of non-production or lower priority production with your critical production applications.

Nor is **ThruPut Manager AE** an application code, job-stream or scheduling optimizer. Good tools are available for such purposes. Rather, **TM AE** addresses the system management of batch, using its knowledge of the workload and the resources available to automatically process all batch workload through z/OS and JES2 in the best manner possible.

ThruPut Manager AE does all this without changes to user JCL or your native JES2 and WLM. In fact, **TM AE** has a stellar history of keeping up with all new versions of z/OS, JES2 and Workload Manager.

Simplicity

Simplifies the management of system resources and batch workload priorities

- The system environment for batch is easier to set up and maintain
- Ongoing batch operation requires less monitoring and intervention
- Dependency on scarce batch knowledge and skills is reduced
- Datacenter agility is enhanced by removing dependency on user compliance and JCL
- Software can easily be licensed on fewer or smaller images

With **ThruPut Manager AE** the systems environment for batch is easier to setup, operate and support. More of the operational decisions are directly captured by the **TM AE** policies. The de facto SLA becomes obvious and is much easier to analyse and change as your organization changes. The necessary skill level for batch operation and system support is stepped down and knowledge loss when people move on is much reduced.

Since **ThruPut Manager AE** has automatic escalation when goals are in jeopardy of not being met,

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operators don't need to constantly scan for emerging problems, or to mitigate capacity shortages or other system problems by starting and stopping initiators, cancelling and restarting jobs, and adjusting priorities of jobs. **TM AE** either anticipates and avoids the situation (e.g., allocation recovery, dataset contention) or mitigates it (e.g., by detecting where work could run and sending it there, by starting and stopping initiators, by manipulating priorities to give preference to more urgent work) – all automatically.

ThruPut Manager AE decouples datacenter decisions from the classing straitjacket and user JCL. (Without **TM AE** the datacenter is dependent on users to comply with datacenter standards for JCL, classing and using shared resources. Simple changes often require extraordinary co-ordination and involvement with the user community. Users are frustrated with the demands to comply with a seemingly arbitrary set of standards.)

Service

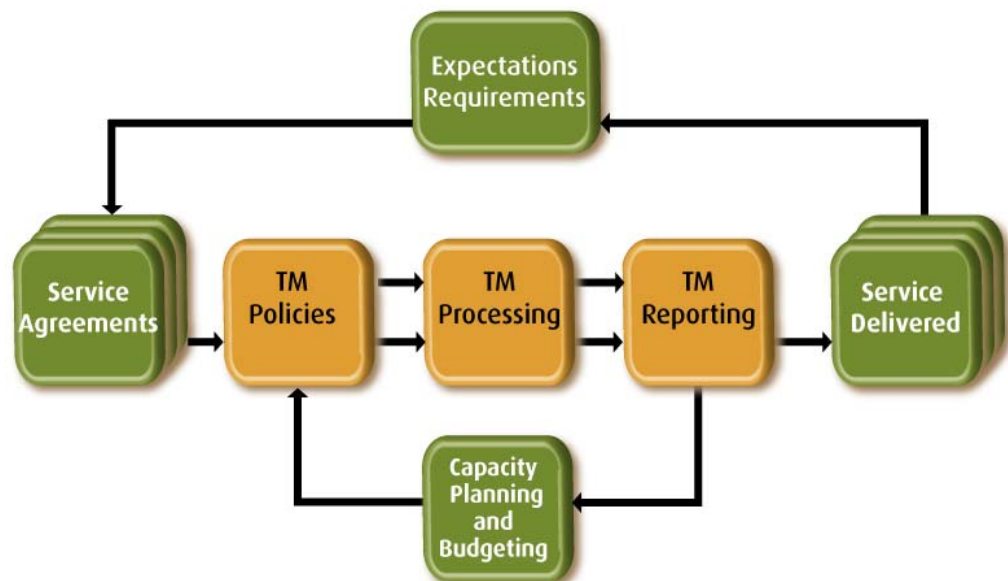
Batch is managed to service goals based on simple wall-clock metrics

- Automatic escalation ensures more important work is favored when resources are stressed
- Batch service is reported to all stakeholders in terms of the goals
- Facilitates creation of Service Level Objectives with users

ThruPut Manager AE adopts a service perspective. Throughout all its functions, it is guided by the user goals for their jobs as well as the datacenter goals (or constraints) for the installation as a whole. A common set of metrics, using straight-forward wall-clock values, are used to express these goals, guide the automation engine and give feedback. Displays and reports use the same metrics to give feedback to users, operations, performance analysts and management. Now everyone can communicate in the same language and mean the same thing.

ThruPut Manager AE and the Batch Service Model:

- The datacenter manager is responsible for taking business goals and datacenter constraints into account and developing a policy to guide Operations in the running of the workload.



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Until **ThruPut Manager AE** there was nowhere to store this understanding, much less have the system automatically use it when processing the workload. **TM AE** collects goals and constraints in a policy. Only one policy is active at a time. There can be a different policy for different situations such as DAYTIME, WEEKNGHT, MONTHEND, HOLIDAY and so on.

- **ThruPut Manager AE** captures service objectives in terms of queue time and execution time goals, as well as relative importance. These are the metrics the automation engine uses to decide which jobs to favor.
- Technical Support staff understand the complex nature of the datacenter resources. Some jobs have to run on certain machines to comply with software licences, or to have access to the correct DBMS, and so on. At run-time **ThruPut Manager AE** uses constraint information to automatically distribute the workload.
- **ThruPut Manager AE** provides an “at-a-glance” view of the entire batch workload such as “batch is being selected within its target and the trend is stable”. When the status is “being selected beyond Acceptable and the trend is deteriorating”, manual intervention is likely still not required since automatic escalation is already doing everything possible.
- **ThruPut Manager AE** provides extensive feedback on every job. Users can check on its status while executing, and they receive a detailed report explaining the service the job received, including sources of delays.
- Technical Support can verify that each business unit is receiving the service they are expecting and explain any periods when those goals could not be met.

Savings

Simplification saves staff time and training for all batch stakeholders

- Software licensing costs can be substantially reduced
- Improved throughput and capacity utilization saves hardware and associated software by deferring upgrades and lowering “soft cap” limits
- Service improvements deliver the business value expected of a modern datacenter

Organizational changes may be hard to predict and quantify but many managers have told us this is where they will realize the most savings. Automating the tedious, labor-intensive and error-prone parts of operations leaves skilled staff free to take on more valuable project work. Having an effective way to capture and act on the user service goals may yield even greater business value.

Easier to quantify are the savings reflected in a datacenter budget. Automation and its attendant optimizations can reduce the batch window needed to run your workload. This can be realized by running on a smaller machine, deferring upgrades to larger machines and/or running with a lower “soft cap”. Whichever option you choose, hardware savings mean savings of system software, since the pricing of most system software, from IBM and other vendors, is based on the hardware it is running on.

With **ThruPut Manager AE**, you can push this strategy one step further. Since **TM AE** gives preference to your important workload, you can now afford to run even more constrained, knowing that only less important work will be impacted. This means you no longer have to size your machines for the monthly peak to ensure your important workloads are not compromised.

ThruPut Manager AE provides an extraordinary opportunity to save software licensing costs. In the

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past, it has been simpler to license all the LPARs in a datacenter for all the licensed software. Work could be moved around without worrying about license compliance and maintenance tasks were more uniform across LPARs. However with licensing costs now comprising a significant percentage of the datacenter budget, that strategy may be questionable.

ThruPut Manager AE mitigates the inconvenience of licensing fewer machines, while ensuring compliance and avoiding penalty charges. Several users, while deriving many benefits from the product, tell us they justify the product on this consideration alone.

ThruPut Manager AE takes a systemic approach to optimizing batch in the z/OS context and savings are derived throughout the system, making batch more efficient and easier to manage in every datacenter.

System Throughput

System resources are optimally used without being overloaded

- Workload is automatically distributed to make best use of available capacity
- Innovative algorithms eliminate delays inherent to z/OS
- Lower priority work doesn't interfere with higher priority work
- Jobs complete sooner easing batch window constraints

A batch job can be processed in a shorter elapsed time with **ThruPut Manager AE**. It stages volumes and recalls archived datasets while the job is in the queue, manages and prioritizes job selection, eliminates execution delays, controls resources, optimizes system load and eliminates interference. These system-oriented improvements and internal efficiencies reduce the time jobs spend in the system.

With **ThruPut Manager AE**, the system is effectively used without being overloaded. Otherwise unused capacity is deployed for useful work. Workload is distributed across available LPARs. Lower priority work doesn't interfere with higher priority work and the most important jobs are **given** preference when the system is heavily loaded.

One might assume all of these things are already happening; however a closer look at how batch jobs are processed by JES2 shows that is not the case. With the optimizations from **ThruPut Manager AE**, more batch work can be completed in the same batch window.

Automated Capacity Management

ThruPut Manager AE now provides automated capacity management facilities for installations using or considering sub-capacity pricing. In addition to the existing automation and optimization features, installations can constrain or defer low importance batch as a peak approaches and resume normal service when it passes, generating significant monthly software savings with no impact to online service or mission critical batch.

Generate Real Savings

For intermediate-sized installations, system software fees can be \$500,000 to \$1,000,000 per month and up. We estimate these installations can save \$40,000 - \$80,000 per month using **ThruPut Manager AE** to manage their processor usage for yearly savings of as much as \$1 million.

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Manage Processor Usage

Installations use IBM's sub-capacity pricing when they want to treat a CEC as smaller than it is, for the purposes of software pricing. This pricing model is based on the 4-hour rolling average, that is, the CPU usage averaged over the previous four hours. The software charges for the month are based on the highest 4-hour rolling average for the whole month.

ThruPut Manager AE continuously monitors the 4-hour rolling average for each LPAR and, optionally, LPAR group, comparing it to a "capacity target" which can be:

- the *Defined Capacity* for an LPAR, or
- the *Group Limit* for an LPAR Group, or
- a capacity target defined to **ThruPut Manager AE** when the installation does not use soft-capping.

When the 4-hour rolling average approaches the capacity target, **ThruPut Manager AE** automatically constrains or defers lower importance batch as specified by the installation, and correspondingly relaxes these constraints as the average decreases.

Relationship to ThruPut Manager SE

ThruPut Manager AE includes all the functionality of **ThruPut Manager SE**. **TM SE** depends on installation rules to invoke the services of core components (the ThruPut Manager base, TM/DCS, TM/DBS, TM/RSS, TM/UCS, and TM/JBS). As appropriate, **ThruPut Manager AE** invokes these services automatically and directly, without the need to interpret rules.

An upgrade path is provided from **TM SE** to **TM AE**.