Technical Storage

We are a Major French Bank. Over the past few years, we have been performing **data migrations** in order to regroup several of our IT sites into one. At the same time, we have seen a number of our technical executives with knowledge of MVS z OS go into retirement. As of today, we have very large disk configurations reaching **petabytes**, even larger backup cartridge configurations (dozens of petabytes) and a number of LPARs exceeding 60. As the configurations have grown, our personnel have shrunk.

We don't encounter enormous hardware or software problems; z OS material proves very reliable to this day. Neither do we face grave problems in regards to I/O performance; manufacturers are competent and configurations are carefully planned out at the time of installation. Later on though, it can become a problem.

To summarize our situation: hardware configurations are very important; our **z OS personnel have decreased**; we manage our growth thanks to hardware / software technological advances when everything performs well.

Once in a while however, like at the end of the month which is our most sensitive period, a particle of sand exposes the vulnerability of our system: an **incident** occurs. It's not a production shutdown which the manufacturers can react to quickly via **Remote Maintenance**. The problem is **hard to detect** as it is **intermittent** and non reproducible. We have to deal with problematic performance behavior linked to hardware applications. It is difficult to get assistance from the manufacturer as we have often heard from them that this type of problem has not occurred with other clients of theirs. Unfortunately most of our senior MVS systems managers and MVS production managers who had experienced such issues in the past and kept them on their dashboards have now deservedly retired.

Our senior management has asked us to look for a user-friendly and cost effective tool that would allow us to **memorize behavioral profiles** so that we may be more reactive when a problem arises and more specifically to direct the incident to the appropriate work group for quick resolution.

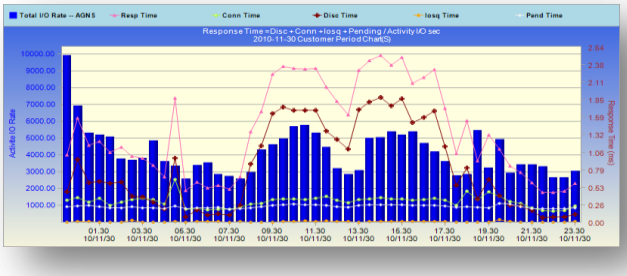
We called upon an **IBM Independent Software Vendor**, **TECHNICAL STORAGE**, a young company led by executives who have over 30 years of MVS expertise. This company specializes in data storage management in the z OS storage universe.

The principles of TECHNICAL STORAGE's tools are simple:
They allow us to **capitalize** on information present in our **RMF** / **CMF** reports. No further installation is required on z OS. The same goes for the SMF records. There are no specific costs in relation to MIPS or MSU. TECHNICAL STORAGE applies the laws of 'regular expression' on our RMF or CMF files for disks, TMS TLMS, CONTROLT for Tape Management, SLS for SUN Robots files and MVC reports for VSM SUN virtualization sub-systems. Our files are simply analyzed by their tools and the results are memorized so we can build our **archive of benchmarks**.

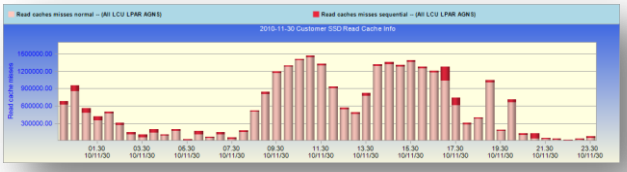
EADM (**E**asy **A**nalyse **D**isk **M**ainframe)

EADM analyzes RMF and CMF files 24/7 on one LPAR or on all LPARs. EADM can analyze one or several STOGroups for a specific volume or a pool of volumes on a CISC. EADM shows us in a few seconds LCU and FICON loads, NVS loads and memory per SSID and 3390 volume. Since the new RMF and CMF releases, EADM now shows **Front End and Back End** activity. The **audit** will be presented on a DASHBORD that can be **easily consulted** in case of performance problems. In May 2010, we made an important change of hardware on our IT site. Several days following the change, we experienced delays in the Batch production cycles (over 1 hour per night). The manufacturers were scratching their heads with this very intermittent problem. We then performed studies on previous I/O profiles from all disk arrays on site with EADM. In a few minutes EADM revealed an important change in the **Pending Time** component of the **Disk Response Time** (change of about 100%) at a certain time of the day. We gave this information to the manufacturer who then was able to resolve the issue quickly. It is evident that having important in-house archive of benchmarks on a 24h / 365 day basis allows us to understand the underlying nature of an I/O performance incident.

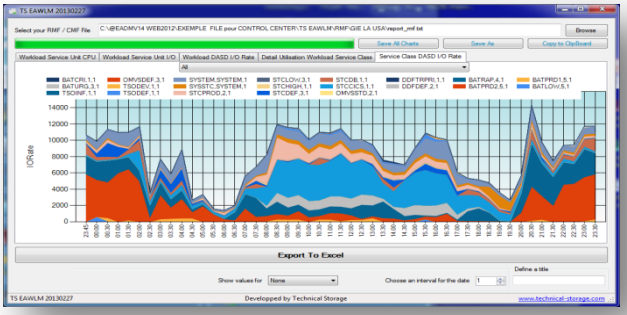
Example of a problem encountered:



During a DB2 version change, we noticed a sharp increase of Disk Time. Questions we faced were:
must we do something?
Is it a serious problem?
Is it urgent?

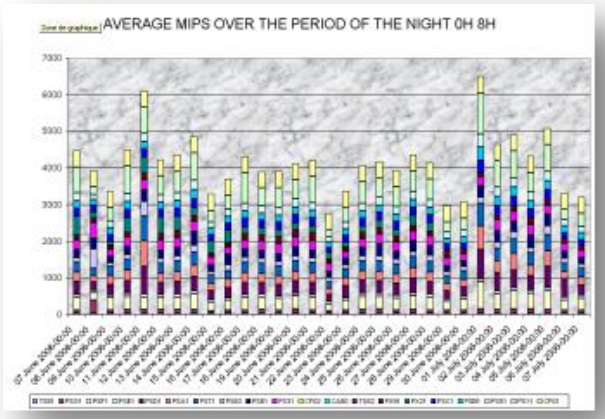


EADM quickly showed us that the disk memory size was too small due to Tracks cache miss.



Exploitation of WLM information from the Technical-Storage Control Center allows us to have a **correlation** between disks activity and performance requirements of the Class service (by priority).

EAMC (**E**asy **A**nalyse **M**ainframe **C**heck)



We are also using **EAMC (E**asy **A**nalyse **M**ainframe **C**heck) since January 2011. This module allows us to **monitor MSU / MIPS** consumption per LPAR at low cost. The module also allows us to visualize MSU consumption and the number of I/O disks on a same graph, which is very appreciated in case we modify the weight of our LPAR

EATM (**E**asy **A**nalyse **T**ape **M**ainframe)

EATM analyzes Tape Management files (TMS, TLMS, ControlT,) SLS files report on SUN Robots, and MVC files report on virtualization sub-systems. These analyzed files build up an ACCES database with EATMV6, or SQL2005 with EATMV14. EATM analyzes LPAR per LPAR or several LPARs if the Tape Management is shared. EATM shows the real written capacity on cartridges or on cartridge pools consisting of real and **virtual cartridges**. EATM shows more specifically real components of the automatized cartridge sub-systems. We can answer such pivotal questions as: 'have we reached the maximum of real capacity for backing up our information? Must we urgently plan the purchase of new cartridge support? Do we have a good policy when it comes to Scratch cartridges? Do we have a good 'defrag' policy of our MVC cartridges which record our VTV (virtual) cartridges? Do we have a good policy in regards to archives management? Having 3 Giga of data on 120 cartridges created in 1982 is no good. EATM's '*full auto'* module allows our production team to not take action on our tool; the Dashboards are **automatically fed**. EATM enables construction of a global EXCEL chart including all pertinent components to watch out for.

In October 2011 we were requested to integrate a new IT site within our SYSPLEX. EATMV14 enabled us to solve in a few minutes cartridge resource problems. After using the tool in automatic mode for 3 months, we gained enormously on the number of allocated Scratch. The 'defrag' rate was very low. As a result our MVC cartridges were used at a fraction of their capacity. We had the pleasant surprise after using the *'cartridge time analysis'* module to discover that a lot of 70,000 virtual cartridges had been created

during a training session in 2000 (they were not supposed to be in the cartridge pools anymore but they still were). We are also going to use EATMV14 to simplify our backups: we have HSM (IBM) and CA-DISK (DMS/OS) which organize a number of backup tasks but we think it might be redundant with our VMS SUN STK. EAMTV14 shows in a simple way on a graph CA-DISK (logical and physical) backup behavior. Another advantage of EATM is that with each Run in manual or automatic mode, EATM drafts a Word report which is used today by the IT executives to follow the evolution of this storage station which bears importance due to its costs and how strategic it is in regards to the data and archives of our company.

Conclusion:

Though we have other tools to monitor the performances of our Information Systems, because of the simplicity and the easiness of their implementation, EATM, EADM and EAMC have become major production tools for us. The pertinence of the information extracted is appreciated by all concerned. We are often overwhelmed with data and issues we face are: how do we improve our team's know-how and how do we uncover true performance problems. TECHNICAL STORAGE answered these two key questions by giving our staff the know-how with their BIG DATA approach which provides us with an archive of audit benchmarks over 30 days. As our Director of Information Systems states: *'It's a fully dressed, plug-and-play solution. It's a fully automated tool that sends audit reports via* ***internal email,*** *and that is a big plus for the security of our data.'*