



TaskMaster v3: The NetWare Task Scheduling Tool White Paper

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TaskMaster v3: The NetWare Task Scheduling Tool

Abstract: The following profile examines the TaskMaster v3 Server Task Scheduler and Batch Processing utility for NetWare Servers from Avanti Technology, Inc. TaskMaster is a NetWare server console extension and task scheduler program. It has an excellent and deserved reputation as a stable, hard-working tool. This document will review some of the uses and users of TaskMaster, and see why it is the tool of choice for a growing number of NetWare shops.

Introduction: The system manager's day is always full and busy. Countless things to remember and do. And much of it has to be accomplished with a background chatter of emergencies, urgent meetings, and – all too often - unhappy users. It's not a surprise to anyone that things fall through the cracks, and which leads to more pressure.

Cobbler's children are said to always be barefoot, so it shouldn't be a surprise that MIS is often a late adopter of automation technologies. However, automating system management tasks relieves the day-to-day pressures, letting important staff concentrate on issues and long-term priorities, instead of fighting fires. Old Unix managers understand that idea, and are active users of the Unix task scheduler, CRON. When they migrate to NetWare they soon ask, "Where's CRON?" Even today, Novell does not bundle an officially supported CRON type scheduler with NetWare, although an unsupported version of CRON can be downloaded from Novell's WEB Site. Because NetWare is a client-server operating system specializing in print and file services, Novell's development efforts have been focused on having most administrative tasks handled from a PC on the network, not from the server console. As a result, Novell has historically done little to make the console easier to use or more efficient.

Avanti Technology stepped forward in 1994 to remedy this situation with TaskMaster, after having also developed the award winning NConsole Server Trends Analysis for NetWare and the NodeInfo Server Connection Management for NetWare utilities. TaskMaster has earned the reputation of being a hard working, stable program that fills in the gaps that Novell left in the console. However, because TaskMaster is a powerful tool with a rich scripting language, some system managers look at TaskMaster and are initially overwhelmed by it.

Case Study 1 - U.S. Bureau of the Census: The year 2000 fills many network managers with dread, but for the managers at the Census Bureau there is more reason for concern. The year 2000 is the year of the millennium census, also known as the Decennial project, the largest census the US government has yet performed. The Census Bureau uses many computer and networking platforms to meet their goals and management is a real issue. The Census Bureau wants to make sure that the staff in

each office has access to the same tools and is running the same versions of the same software. Synchronizing these servers is a real issue.

Since the Census Bureau is a Novell shop that uses Novell's Z.E.N. and ManageWise, it seemed a no-brainer to use Novell's Novell Replication Services (NRS). However, it actually proved to be a no-worker.

The Census Bureau has a complex network encompassing 500 field offices each with about 15 users connected to their own NetWare server. Using a variety of communications lines, these 500 field offices connect to 18 regional offices, which in turn each have as many as 130 users connected to several NetWare servers. The regional offices are in turn connected to the national headquarters.

Early trials using NRS version 1.1 failed to produce the desired results. The databases on the servers became corrupted, and NRS cheerfully deleted files to match what the database indicated should be in place. At times, the master files were deleted, even though the number of servers used in testing was small. While Novell says these problems are resolved, the current Novell documentation still indicates that NRS isn't suitable for replication structures much larger than 200 servers.

Dave Sliom, Senior Network Manager, Decennial Systems & Contracts Management Office, heard about Avanti Technology's TaskMaster and reluctantly tried it out. He soon became a convert. One thing that impressed him was the absence of a database – if there's no database, there's no database corruption. TaskMaster's synchronization process compared the source and target servers then migrated the files as needed. No database needed to be built or maintained. All TaskMaster required was that the source server contain the files which needed to be synchronized to the target server.

What impressed him more was that it did the job for him. Dave commented that things got even better after that.

Dave found Avanti Technology very responsive to change requests. TaskMaster enhances the NetWare console, but Dave didn't want regional and field system managers to have access to the enhanced commands. Avanti Technology quickly modified provided an option so the enhanced console commands could be disabled to local use, while allowing remote servers to use the commands when needed. Several times the Census Bureau wanted program enhancements. Dave found it easy to find and talk to the TaskMaster developers and get the enhancements added to the program. Dave says he hasn't had that level of support from other vendors.

It also didn't hurt that the list price for TaskMaster is less than half the price of NRS. Dave said he would have been happy if software synchronization was all TaskMaster had done for them. However, being a flexible task scheduling system, it does much more for them. Any time housekeeping or system maintenance tasks need to be performed, the answer seems to be TaskMaster.

When the Census Bureau needed to roll out the latest NetWare patches to their servers, the Decennial project used TaskMaster. The patches were distributed, and – as needed - the servers were automatically rebooted at the end of the distribution. The Decennial project and TaskMaster enjoyed 100% success. Another group in the Census Bureau used NRS and had a 30% success rate.

Dave Sliom's programmers were creating jobs the first day they had TaskMaster. TaskMaster's scripting language is similar to the DOS Batch language with new functions added to make manipulation of NetWare easier. The programmers credited the many well-documented sample scripts provided with the program, as well as the clear manuals and expert phone support, with making it very easy to create scripts that accomplish the tasks they need.

Case Study 2 - A Major Database Software Vendor: This TaskMaster User (whose legal department declined to allow their name to be used) has training centers in 36 cities around the North America. The classes are a major source of revenue, with about 2,000 students taking classes delivered by NetWare servers each week. By company policy, any service outage longer than three hours causes a class to be canceled, with a refund of the class enrollment fees, and giving replacement classes – with transportation – to all the inconvenienced students. This means there is intense pressure to make sure the classroom systems work, and work right. At the end of each week-long class, the system managers have to clean up the students' workspaces to prepare for the next week's classes. TaskMaster's scripting language made this task easy to automate and was also used to synchronize software between the national headquarters and the classroom servers. As a result, no one has to remember to setup the classrooms - once scheduled, it just happens. The Classroom System Manager is only half joking when he says without TaskMaster, he'd just have to shut down.

Case Study 3 - Golden Triangle Network Consultants: In preparing this paper, Golden Triangle made extensive use of TaskMaster to replicate software between servers and to handle routine tasks on our NetWare servers. In addition to becoming familiar with TaskMaster, given the reports from the Census Bureau (see Case Study 1, above) we wanted to try replicating software with NRS and TaskMaster to see what the differences are from a system manager's point of view.

TaskMaster consists of three client programs, and two server based programs.

TASKMSTR.NLM: An NLM that extends the NetWare server console command set and provides batch processing facilities. It adds fifty-four commands to the console, tracks the scheduling of the tasks, and executes them at the appointed time. This gives the console operator power similar to what a DOS user enjoys, including familiar commands such as ERASE, DELTREE, and XCOPY.

TMSECURE.NLM: An NLM created in response to customer requests for a more secure method of processing tasks and controlling the extended NetWare server console command set. It honors the extended commands when they are issued in a script or submitted by another server running TaskMaster, but not from the server console. This helps keep remote staff from causing too many problems at the server.

TMREMOTE.EXE: A DOS based remote control program for accessing the server console, similar to Novell's RConsole. However, it authenticates the client connection to the bindery or NDS, and will deny unauthorized access to the console. It puts less of a load on both the client and the server than RConsole, and it feels more like actually being at the console than RConsole. It also supports up to 16 separate sessions to the server – long term RConsole users can tell you that RConsole sessions tend to interfere with one another.

TASKMSTR.EXE: The TaskMaster Windows based client-scheduling program. It lets you schedule tasks on all your servers from your desktop, controlling what commands will be scheduled, and when. The interface is very clean and easy to use.

TASKBLD.EXE: TaskBuilder is the Windows based task editor for TaskMaster. It helps you create and manage TaskMaster scripts. It's been a few years since I programmed for a living, but I would have killed for tools as nice as TaskBuilder. It allows you to view the definition and syntax of supported commands, and paste the command syntax into the script file you are working on. Perhaps you can't quite remember if this language uses a while, a do, or a loop command to start a loop? No problem, it's in the help. (To save you the trouble of looking it up, or the irritation of wondering, it uses "loop".) This made it very easy to create and modify TaskMaster scripts. Since scripts are simple text files, the use of TaskBuilder is optional and you may use whatever editor you prefer, if it can save to plain text files.

After we became familiar with the tools, it was time to create a first script. The mail server at our ISP needs to have the SMTP "ERTN" command sent to it from time to time to cause it to forward any mail it is holding for us. There is a free NLM that will do this, but its timing command isn't very flexible, and it isn't very robust – it just hangs from time to time. Worse, using its timing options means there is another NLM in memory, consuming resources that could be used for other purposes. So, this was a natural first script – it was easy enough that we wouldn't get lost in the logic of the task, and it wasn't a make-work task. The script consisted of the command to load the NLM that sent the ERTN command, along with the command line options needed to make sure it talked to the right mail server. Then it was time to schedule the task. TaskMaster let us set up the task to repeat daily, three times a day, seven days a week. Customer complaints about mail that doesn't make it here are a thing of the past.

**This script is available on Avanti Technology's WEB Site:
<http://www.avanti-tech.com/taskmstr/etrn.tsk>**

For a second attempt, we decided to combine two of the many scripts that Avanti Technology includes with the package. Avanti Technology includes a script that

removes all backup and temporary files from the SYS volume of the server. They also include a script that scans all the volumes and returns statistical information about them. We wanted a script that would scan all the volumes, remove the temporary and backup files, and then purge the volume. This would not only clean things up for backups, it would help speed NetWare server reboots - too many deleted, but not purged, files can make a NetWare 3.X or 4.X server take a long time to mount volumes. The usual learner's trick of looking at other people's code and modifying it worked very well, partly because the bundled scripts were very well documented. We especially appreciated the ability to redirect the output of the script commands to logging files, as this helped us more quickly debug the script. About three hours later we had a script that would process all the volumes on hard drives, deleting the temporary and backup files, and then purging the volumes. We used TaskMaster to schedule the task to run just before our weekly full backups.

**This script is available on Avanti Technology's WEB Site:
<http://www.avanti-tech.com/taskmstr/cleanup.tsk>**

At this point, considering the Census Bureau's comments (see case study 1, above), we felt it would be a good time to look at data synchronization. We started by using Novell's Replication Services. Our test LAN consisted of two IntraNetWare 4.11 servers connected via a 100BaseT link. A 100mhz Pentium powers the main server, while a 166mhz Pentium MMX powers the other. We installed NRS version 1.2. The installation was quite easy, although we were surprised that Novell was using a NLM based installer, rather than the very nice client based installer they've used for some recent products, such as FastCache.

Once installed, the administration of NRS was handled via NWAdmin. It was easy to select volumes to be replicated, and to designate directories to ignore in the replication process. Synchronization could be one or two way. We found that when the synchronization was in progress, the servers were unacceptably slow. People working on other projects called and asked if the servers had died.

It's easy to say that in most shops replication will occur during off-hours. But as enterprises spread across the globe, e-commerce becomes more important to companies bottom lines, and more road-warriors check in at all times of the day and night, coming up with a working definition of "off-hours" becomes rather difficult. At the same time, the demand to use these dwindling off-hours is increasing. As systems get larger, it takes longer to complete backups. The batch runs that were done at night are taking longer as databases become larger and more complex. And new demands, such as replication, are put onto systems for off-hours processing. It's getting harder and harder to be able to count on off-hours.

After looking at NRS, we replicated the replication - using TaskMaster. The difference between the two is like switching from a car with an automatic transmission to one with a standard. The installation was quick and easy, although we did have to start the NLM's on the server manually. Once that was done, we decided which directories to replicate, and if we wanted one-way or bi-directional replication. We put the

appropriate commands into a script, and scheduled the script. And then the data was replicated. While the TaskMaster synchronization did slow down the servers, we didn't get complaints, or put another way, no one thought the servers had locked up or died. The synchronization script was two lines long. One line was a comment that identified the script and what it does, the other was the actual synchronization command. The simplicity of the command line left our programmers feeling good.

**This script is available on Avanti Technology's WEB Site:
<http://www.avanti-tech.com/taskmstr/syncup.tsk>**

With the NRS package, the programmers had worried that they might have missed a checkbox somewhere and that the results might not be what were expected. And in fact, at one point, we had selected bi-directional replication without realizing it. A staff member deleted some replicated files on the target server so he could see them replicated again. NRS realized that the files were missing, and replicated the changes back to the primary server – by deleting from the primary server. It was working as designed, and it was working as it was configured to work, but it wasn't terribly obvious what had been selected. We were relieved that our backup software worked as designed.

With the script, the command was exposed to plain view, and there was no doubt what was going to happen. We had enabled a one-direction replication, and that was what happened.

One NRS feature is worth special attention. NRS can compress data to make the most of the communications line between the servers. This sounds like a good idea, but it raises some questions. Compression will increase server CPU utilization, which can be a real issue in some shops. Many shops have disabled Novell's file compression because of the system overhead it causes. Enabling compression could require a server upgrade to avoid performance impacts. It also raises the question of where compression should be used. Should compression be tied to specific applications, or should it be handled at a lower communications level? Many communications products already incorporate compression, and passing compressed data to a modem or other device that is going to compress data gives poor results as subsequent attempts at compression can actually increase the data size. My preference is to move the compression and its overhead, to the lowest possible level, to a dedicated communications device (such as a modem) making compression a communications issue, not an application issue, and making the benefits of compression available to all applications on the server.

Before the day was out, our staff was very comfortable with the scripting commands and language. They have been looking for more problems to solve using TaskMaster ever since.

Reports from other customers: What other customers have told us they do with TaskMaster.

- Prepare systems for backups - Notifying users of the impending backup operation, clearing User connections who do not log off after notification, and even disabling the real-time scanning feature in anti-virus NLMs (or unloading the Anti-Virus NLM before backup and reloading it afterwards).
- Automating database backups - Make sure no users are in the database, shut down the database engine, backup the database files, and then restart the database engine.
- Distributing software updates – Make sure all users are off the system, and then distribute critical software updates, such as anti-virus updates.
- Clear user connections after hours - To eliminate the security risks presented by users who don't log out at the end of the day.
- Schedule periodic file system maintenance - Deleting temporary and backup files which have not been recently accessed then purging the volumes of deleted files to optimize disk space and performance.
- Recycle the server on a periodic basis - Automate the restart of the server to reclaim 'leaking' memory and defragment memory tables.
- Managing NLM resources - Load and unload NLMs as needed (such as Backup NLMs) to maximize resources.
- Analyze users disk space utilization.

One Avanti Technology customer summed it up pretty simply, "You're right – TaskMaster ***WILL*** do everything but cook my dinner!" That's a bit more than Avanti Technology is ready to promise, but we don't think you'll find a more powerful or flexible job automation tool for NetWare.