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Rocket z/VM Training VM Workshop 2025

"Now that I've plugged it in, how do I turn it on?"

From Installation to Impact: Making IBM Operations Manager, Tape Manager, and Backup & Restore Manager for z/VM Work for You

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Abstract

- You’ve installed the tools—now it’s time to make them deliver value. This “beyond the basics” sessionfocuses on practical configuration and real-world usage of IBM Operations Manager, Tape Manager,and Backup & Restore Manager for z/VM. Learn how to: - Configure console monitoring and establishautomated operations schedules with Operations Manager - Provision and manage tape resources tosupport reliable, scheduled backups with Tape Manager - Integrate these capabilities to implementfully automated backup procedures with Backup & Restore Manager Walk away with a clear,actionable approach to turning installed components into an operational, resilient system.

Speaker's background: "Embrace the Weird!"

- I wrote my first mainframe programs in 1979 (OS/MVT 21.8F using CALL-OS, FORTRAN, BASIC, and York APL);
  first IBM 370 assembler code in 1980.
  - "I think I'm making progress."

- A one-line career summary: "Deep on IBM Z System virtualization, Unix & Linux; broad on… a bunch of weird stuff."
  - VM since 1979; Various incarnations of Unix since 1983
  - Linux since the beginning of Linux (Slackware, 5.25" floppies, 1993)
  - Enough MVT / VS/1 / MVS / OS/390 / z/OS to be dangerous
  - z/VM Product Engineer at Rocket Software, Inc. since 2003
    - Role expanded beyond z/VM to "Geek of Virtualization and Container Technology on IBM Z" in 2022.
    - More recently: Custodian of Rocket TMON for VSE

Not Me ☺

- It continues to be a long, strange trip:
  - IBM 8100, IBM 3650, CADAM, Amoeba, Plan 9, MUSIC, OS/2, UTS, SCO Unix, TeraData, NetWare, HP-UX, AIX, Ultrix, Solaris, Cluster / High-Performance Computing (Linux+Beowulf, Myrinet, InfiniBand),
    Image Processing, Embedded Systems, First IT Security Officer for U. of Arkansas
    - Outside of IT: Gentleman Farmer, Certified Emergency Medical Responder, State of AR Law Enforcement Officer
    - More generally: "I'm having a great career based on working with the weird stuff."

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Outline

Presentation roadmap

- Foundations: Things you should already know or have
- Boundaries: Scope and scale
- Architecture Review: z/VM system organization
- Big Picture: Recommended order of operations
- IBM Operations Manager 1 of 2: Virtual machine console monitoring
- IBM Tape Manager: Preparing to support backup and recovery
- IBM Backup & Restore Manager: A simple "30-day moving window" scheme
- IBM Operations Manager 2 of 2: An added pinch of automation
- Wrap-up: Q&A, Feedback, Discussion

Things you should already…

- …know: What these products are:
  - IBM Operations Manager for z/VM, IBM Tape Manager for z/VM, IBM Backup and Restore Manager for z/VM, DFSMS/VM RMS (Removable Media Services), IBM REXX Library for z/VM
- …have: Basic z/VM Systems Programmer / Systems Administrator skills
  - This material assumes that products are already installed and serviced
    - *We're here to talk about "how to configure and use" not "how to install and service"*
- …know: How to make updates to your CP directory
  - *Examples assume DIRMAINT*

Things you should already…

- …have: Basic knowledge of tape subsystem resources
  - Subsystem type, real device addresses, tape volsers allocated to the z/VM system
    - *"If you're not the storage subsystem admin, understand that you'll be working with them."*
- …have: Management support
  - Installing the products is the easy part; implementation takes time.
    - *Doing it right takes even more time.*
- …know: Customer site policies
  - Decisions involve privileged access management, data retention policies

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Boundaries: Scope and scale

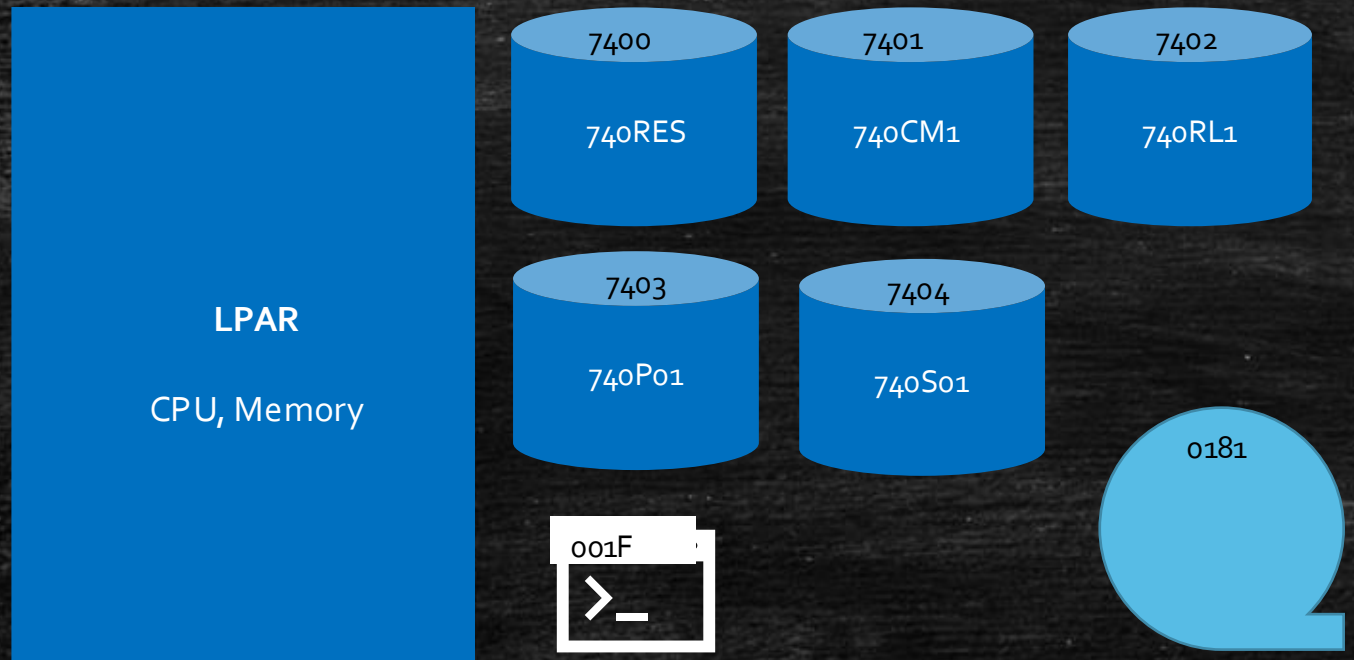
- ***My*** "one size" is unlikely to fit ***your*** "all."
  - Scope of discussion
    - Focus: IBM z/VM systems management tools
      - *Concepts apply to other tool suites; implementation details (obviously?) differ*
    - (Mostly) focused on non-SSI z/VM configuration
      - *Tactics apply to SSI; implementation requires thorough understanding of SSI resource sharing*
  - Scale: Discussion assumes a small- to medium-sized z/VM system configuration
    - Tape is medium of choice for backup
      - *Examples assume TS7700, though processes are largely subsystem-agnostic*
  - Intent: Share enough knowledge to ease deployment and customization

Architecture Review: z/VM system organization

Essential parts of the z/VM operating system

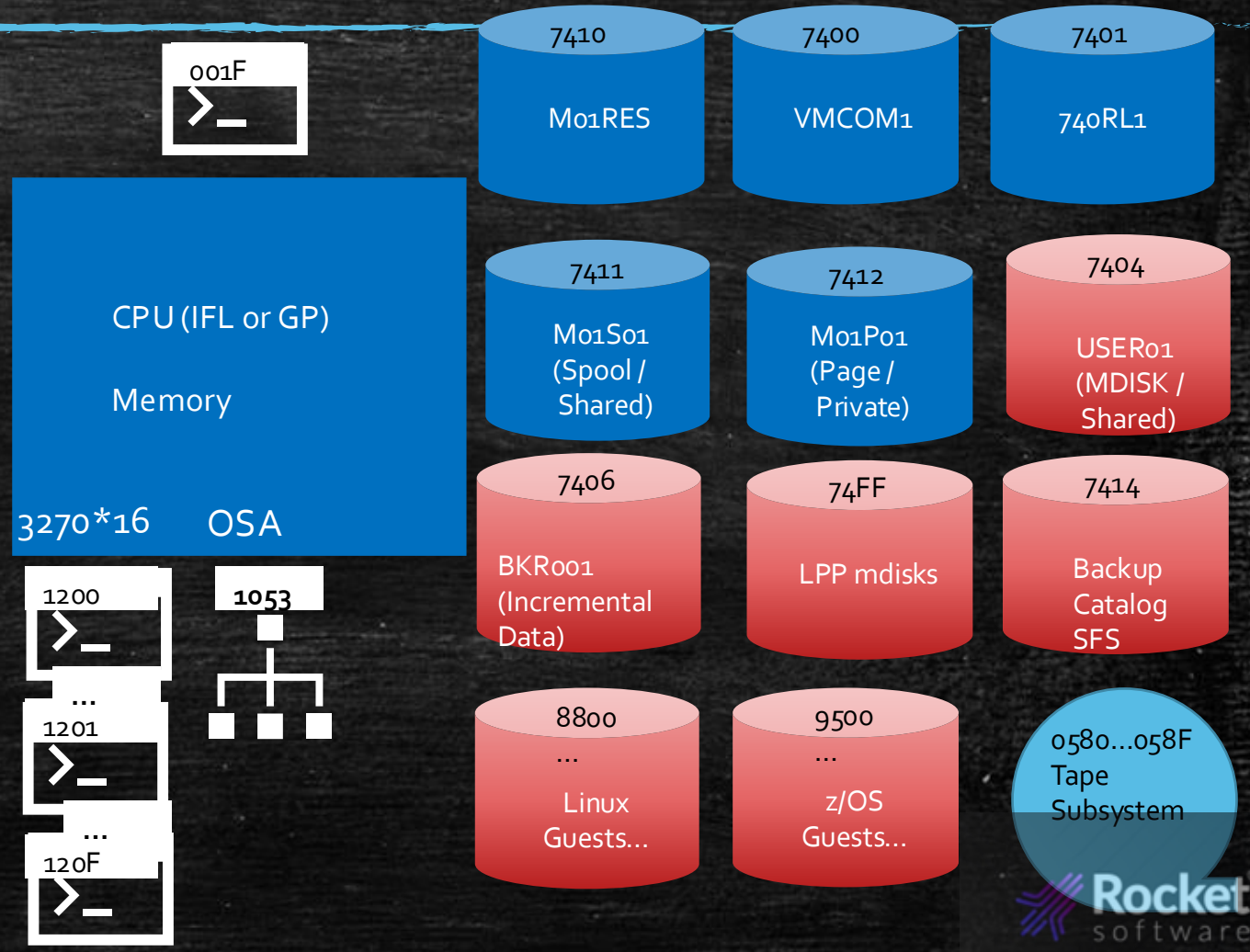
- DASD assets:
  - CP-owned: RES, Common, Release, Spool, Page
  - CP system: "Online and ATTACHed to SYSTEM"
- Non-DASD:
  - At least one system console
  - Tape subsystem (we assume TS7700, where we assume at all…)
  - Login credentials: OPERATOR, MAINTvrm

Architecture Review: Minimal z/VM system organization



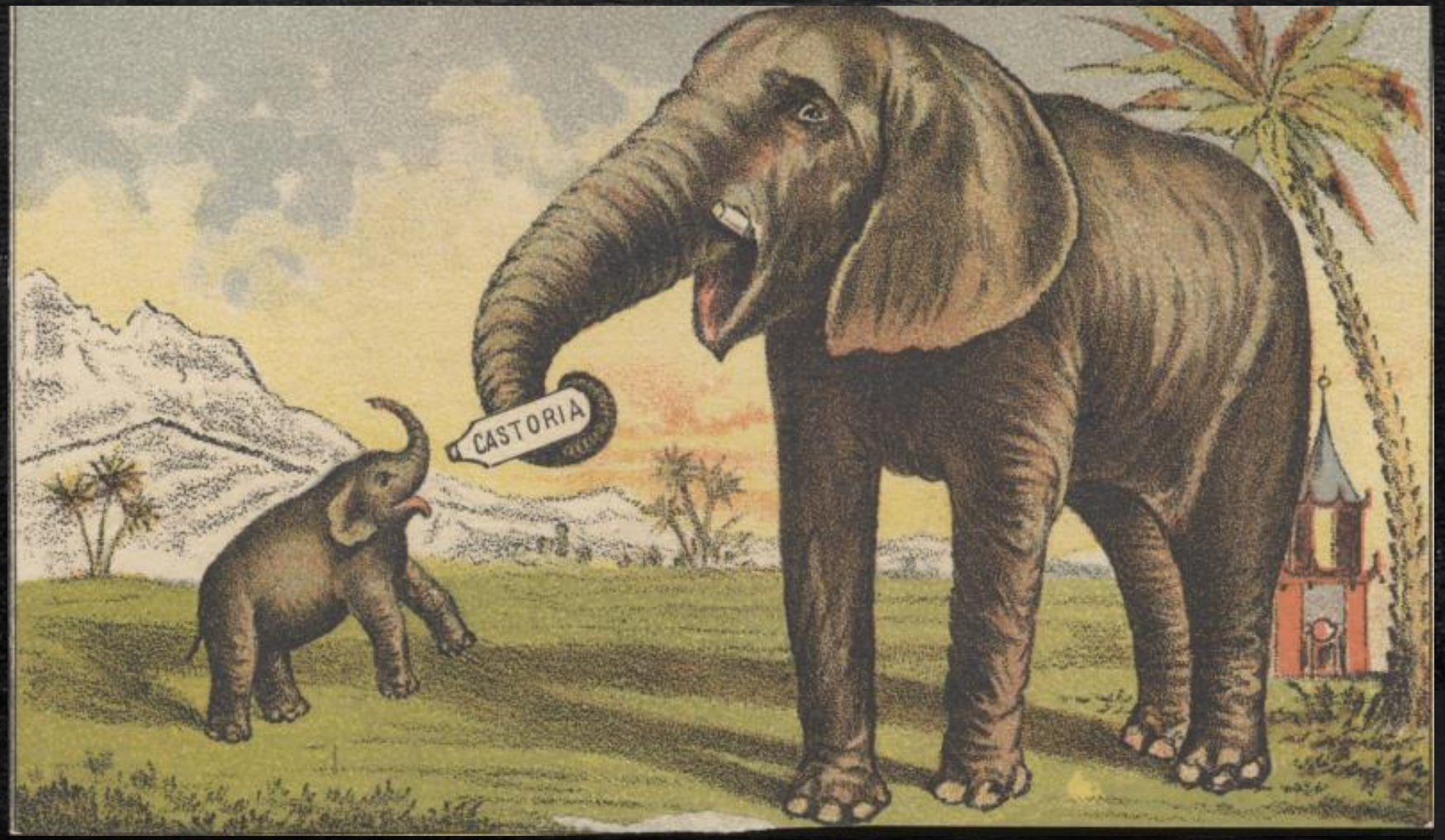
Architecture Review: Somewhat more realistic z/VM system organization

- Expands on the minimum:
- CPU, Memory, Console, OSA, Tape
- …DASD
  - The z/VM minimum set, **plus**…
  - System infrastructure volumes
    - *Program products, non-IBM SFS, installation materials, additional page / spool capacity, RACF database…*
  - User / Guest volumes
    - *i.e. production workload data*
- …TAPE
  - *Though perhaps not actual, physical "tape"*

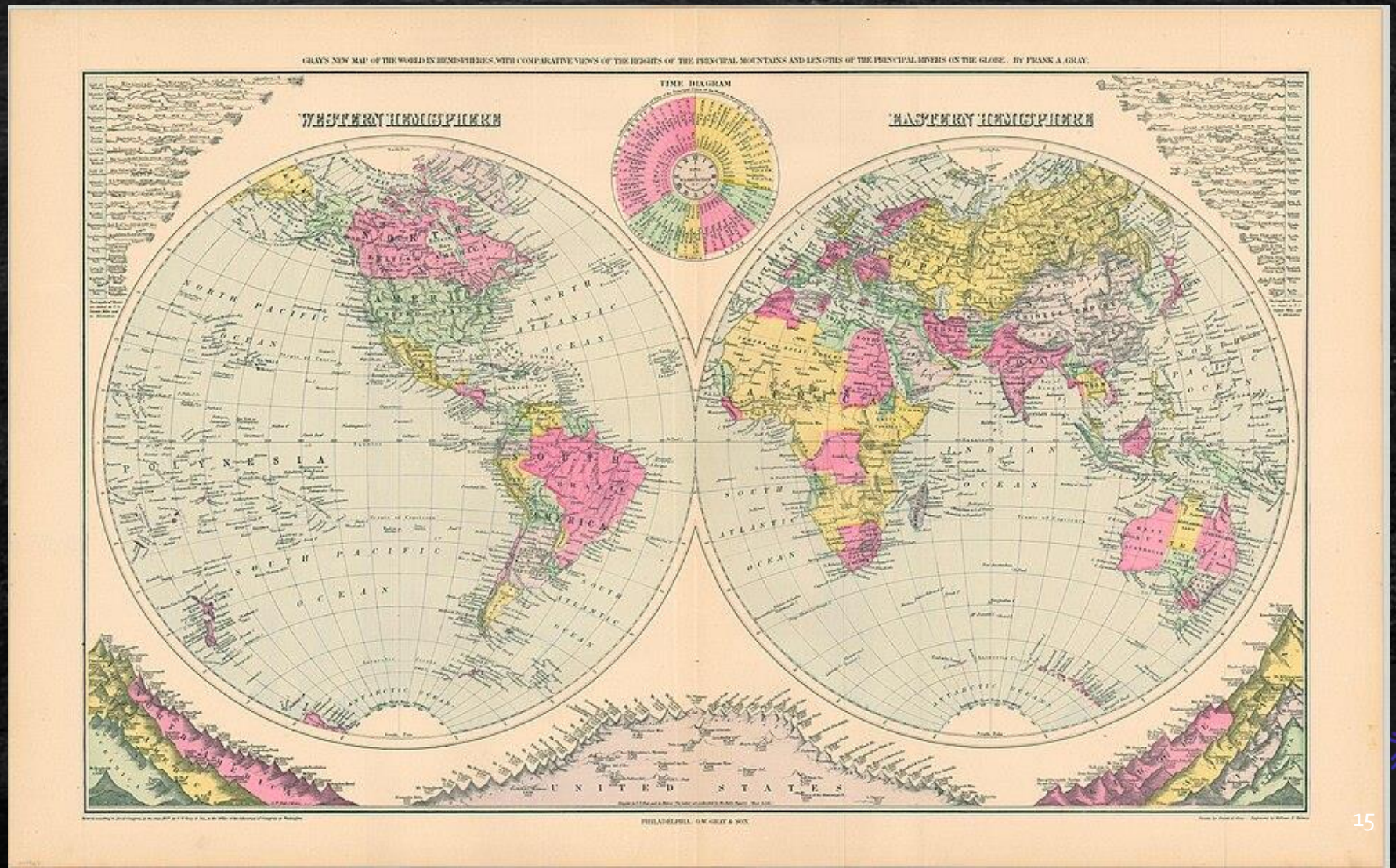


Lots of information here:
How do you eat an entire elephant?

Lots of information here:
You eat it one spoonful at a time.



Big Picture:
Recommended order of operations



Big Picture:
Recommended order of operations

- 1) Foundation: z/VM Operating System and features
- 2) DFSMS/VM (RMS-only installation option)
  - For IBM Tape Manager for z/VM used with IBM (or compatible) tape subsystem
- 3) IBM REXX Compiler & Library –or– REXX Alternate Library
  - IBM Backup & Restore Manager for z/VM –and– IBM Tape Manager for z/VM
- 4) IBM Operations Manager for z/VM
- 5) IBM Tape Manager for z/VM
- 6) IBM Backup and Restore Manager for z/VM
  - *"…plus current service" for each.*

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Big Picture:
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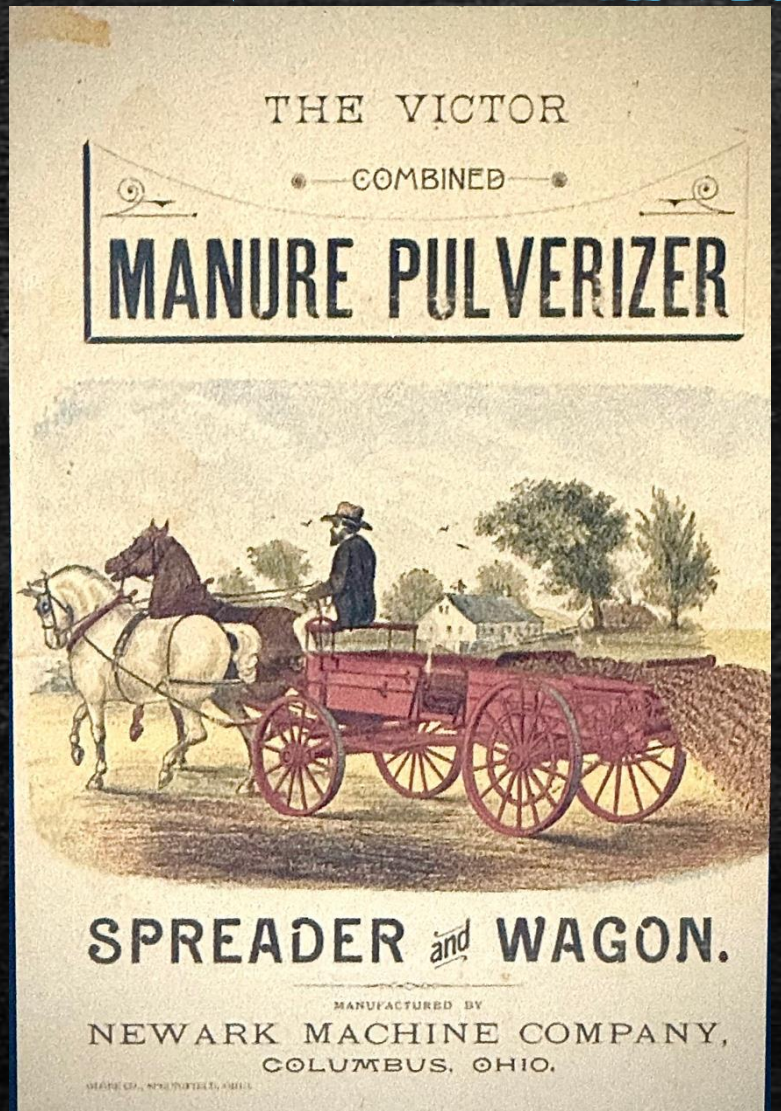
  - *"…plus current service" for each.*

Virtual machine console monitoring: What's the point?



- **"One person's hazardous waste is another person's valuable asset."**

- Operations Manager does a **lot** besides simplify service virtual machine console management.
- Once the product is installed, this capability is easy to configure.

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IBM Operations Manager 1 of 2: Virtual machine console monitoring

- Immediate questions:
  - Which service virtual machine consoles will I monitor?
  - Who can interact with monitored consoles?
  - How much data do I hold in storage for viewing?
  - How long do I need to retain log data stored on disk?

- Apply service!
  - APAR PH50733 (PTF UI83199) – Accommodate 4-character time zone names
    - *"…Plus current service…" disclaimer, again…*
    - *APAR VM66691 (PTF UM90294) – Update to CMS "WAKEUP" for similar issue*

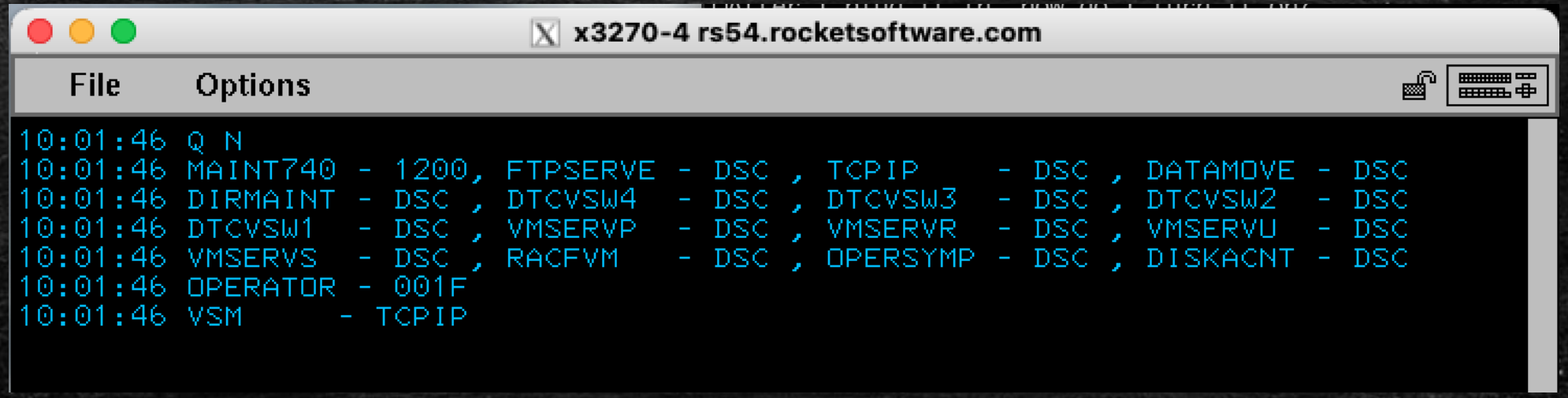
- Problems for future me:
  - What are my requirements for automated scheduling?
  - What messages or conditions indicate a need for human intervention?
  - What messages or events can I handle via automated actions?

Q: Which service virtual machine consoles will I monitor?

- Things to consider:
  - What's active right now?
  - Based on my CP directory, which services should I monitor?
    - Persistent: OPERATOR, RACFVM, VMSERV*, TCPIP…
      - *Ease of use for system operation & management.*
    - Transient: AUTOLOG1, AUTOLOG2…
      - *Only there for a little while, but important!*
  - When adding a new virtual machine to the CP directory:
    - "If my system depends on this service virtual machine…"
    - "If my customers depend on workload hosted in this virtual machine…"
      - *Be proactive: It hurts less to monitor before than to speculate after.*

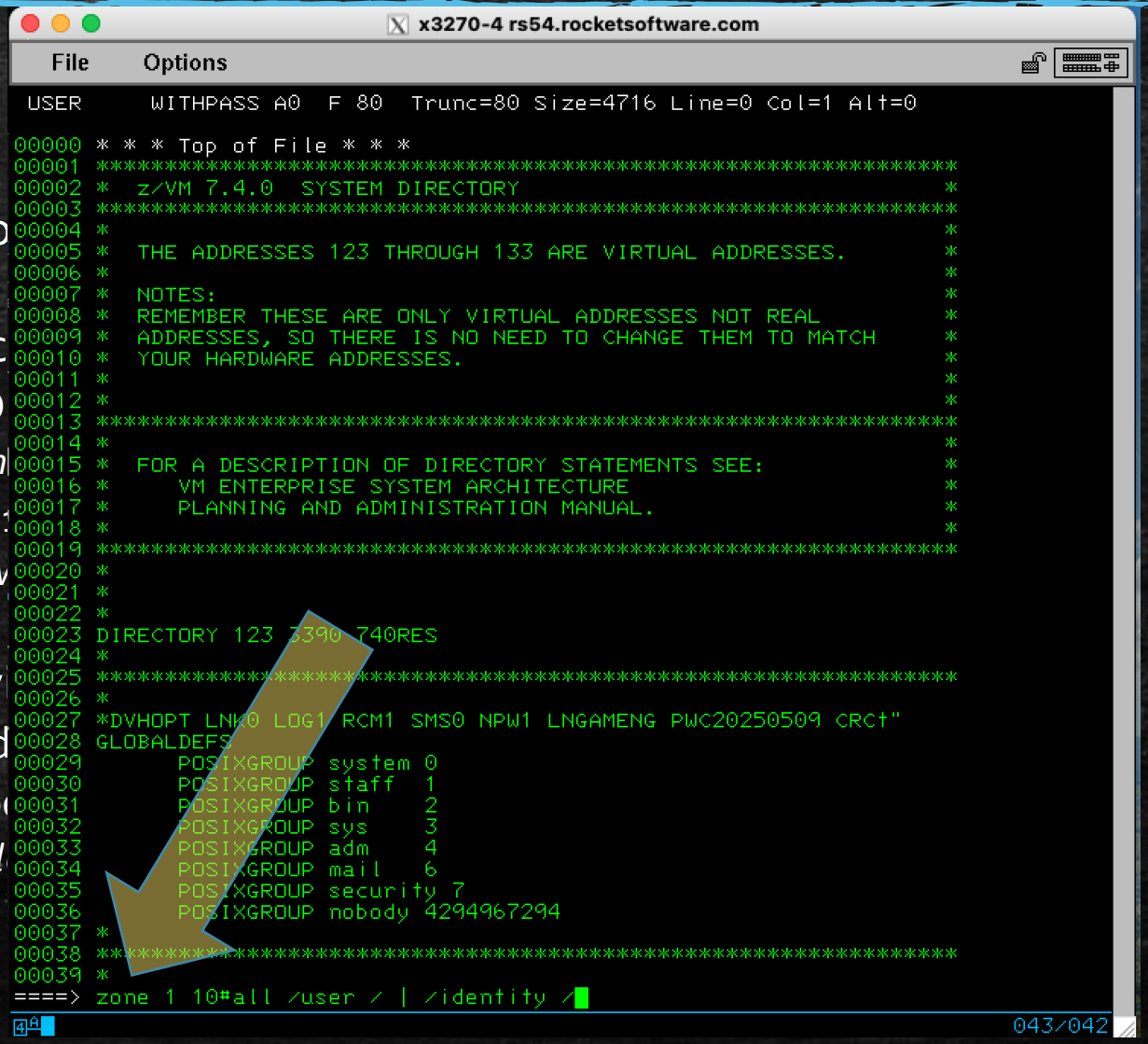
Q: Which service virtual machine consoles will I monitor?

- What services are currently active on my system?



Q: Which service virtual machine consoles will I monitor?

- Things to consider:
  - What's active right no
  - Based on my CP direc
    - Persistent: OPERATO
      - *Ease of use for system*
    - Transient: AUTOLOG
      - *Only there for a little v*
  - When adding a new v
    - "If my system depend
    - "If my customers dep
      - *Be proactive: It hurts l*



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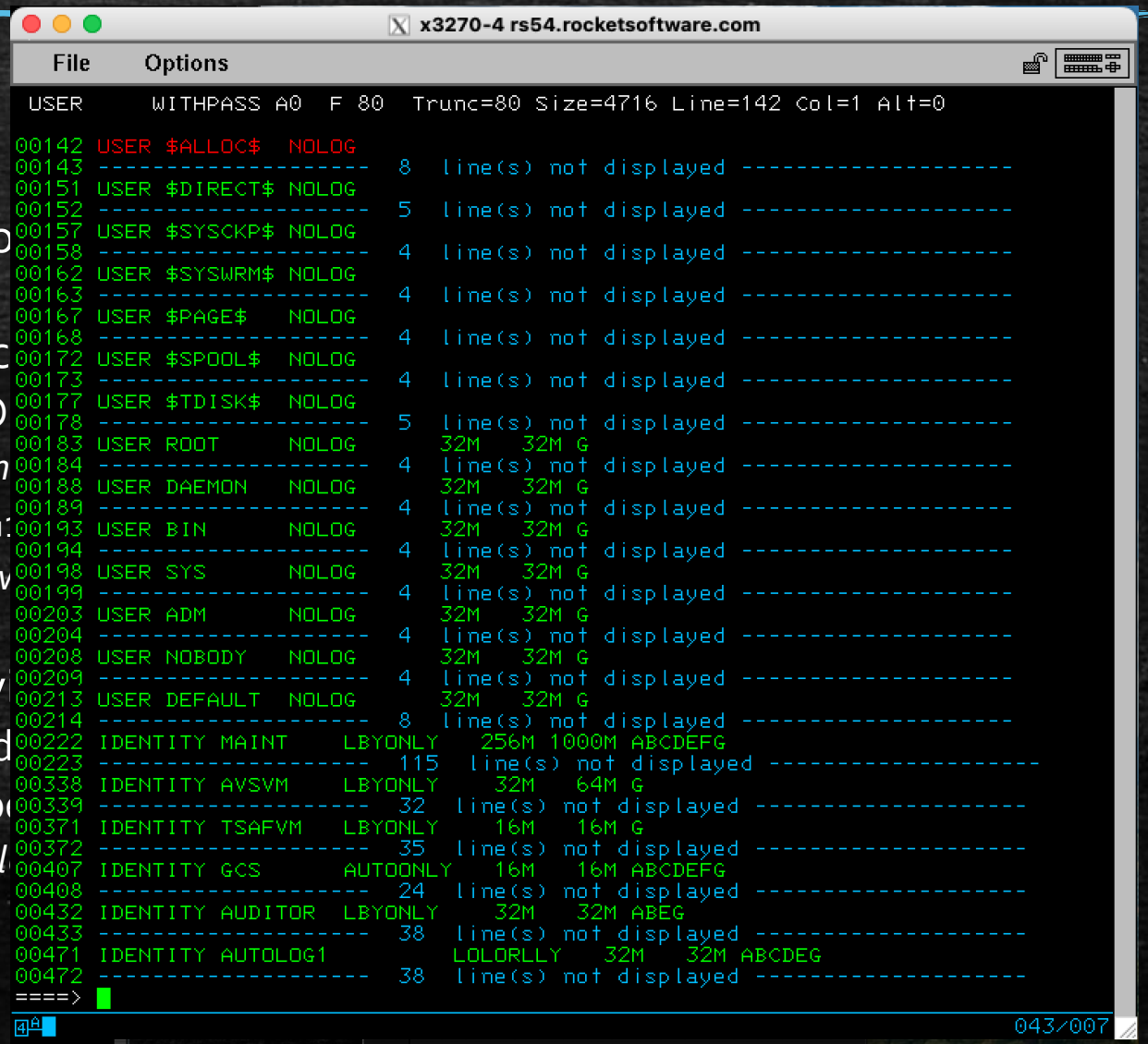


Q: Which service virtual machine consoles will I monitor?

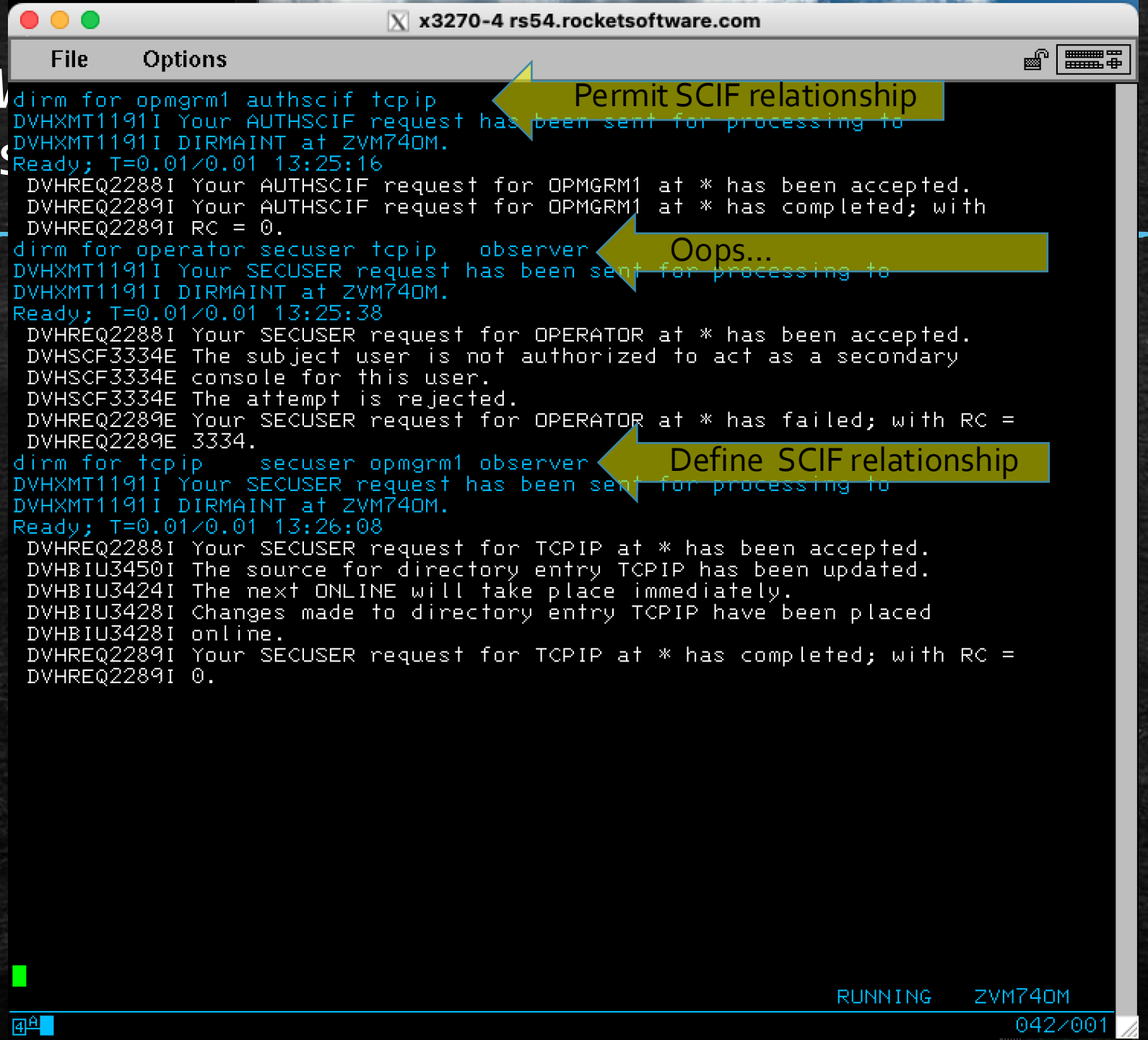
- Console monitoring choices are a "Santa Claus" problem
  - *Make a list, check it twice*

- To enable, modify the CP directory to define SECUSER or OBSERVER relationships between monitored guests and OPMGRM1

- **`CONSOLE 009 3215 T OPMGRM1 OBSERVER`**
  - *OPMGRM1 is the primary IBM Operations Manager for z/VM SVM.*

- Using DIRMAINT:
  - **`DIRM FOR OPMGRM1 AUTHSCIF`** *<monitored_user>*
  - **`DIRM FOR`** *<monitored_user>* **`SECUSER OPMGRM1 OBSERVER`**

Q: W
cons



Permit SCIF relationship

Oops...

Define SCIF relationship

Q: Which service virtual machine consoles will I monitor?

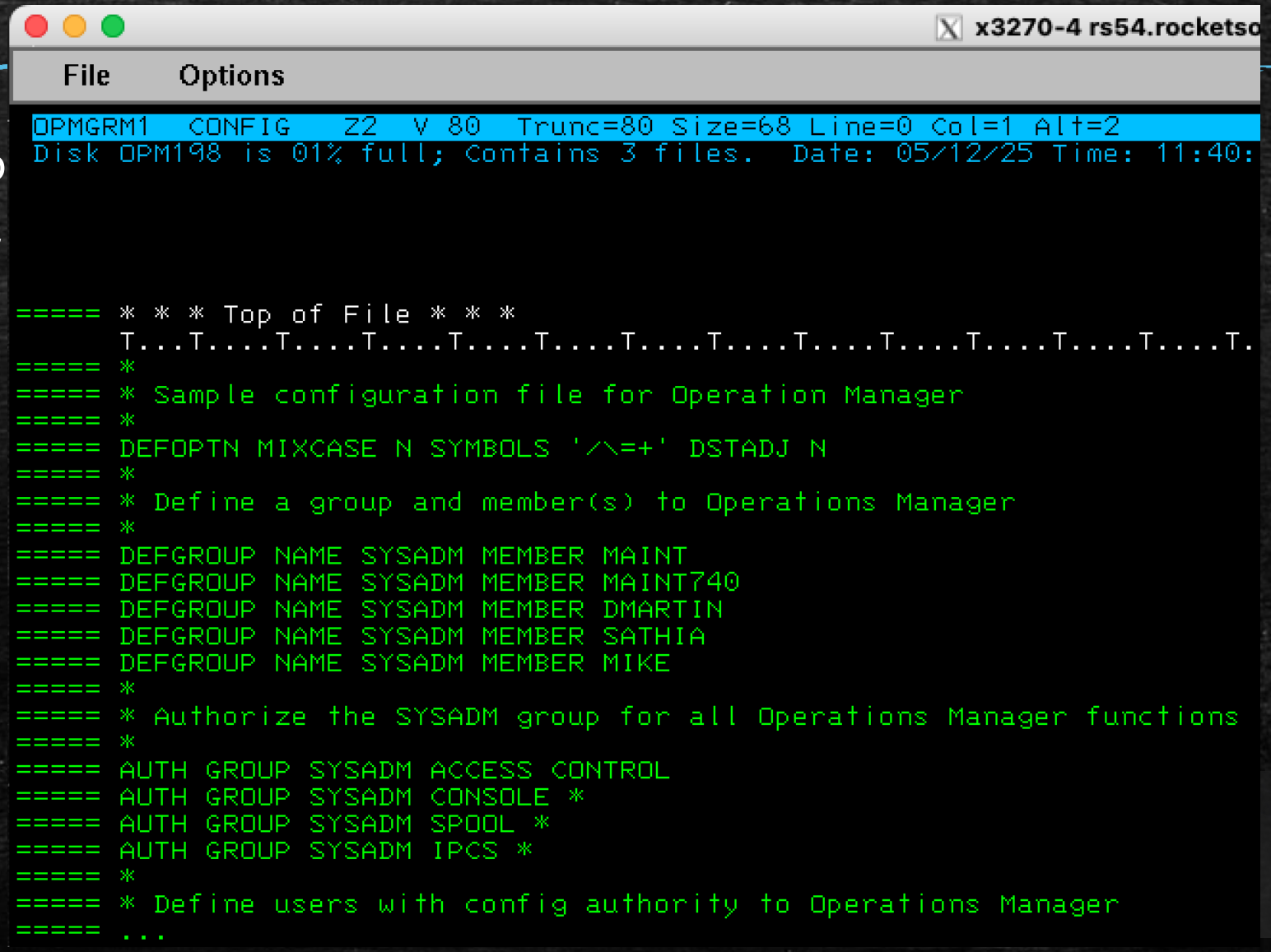
- Repeat for each SVM to be monitored
- Note: Directory updates take effect at next LOGOFF/LOGON or system IPL
  - Use CP SET OBSERVER (or CP SET SECUSER) for immediate / dynamic effect
- Why "**OBSERVER**"?
  - Guest console activity is passed to OPMGRM1 regardless of connected / disconnected status
  - Use your own preference
    - *Policy may dictate preference for you*

Q: Who can interact with monitored consoles?

- Permissions are defined in Operations Manager config files
  - CMS file, normally stored on OPMGRM1's 198 minidisk
  - Starter sample: OPMGRM1 CONFSAMP (look on 5697J10F minidisk 2C2)
- Example:
  - Simplest case: A single, all-powerful group of sysadmins
    - *Review and revise to accommodate installation policy requirements*
    - *RACF (or other ESM) can be used to manage access*
  - Supporting documentation:
    - IBM Operations Manager for z/VM Administration Guide (SC18-9347)
      - *Chapter 3. Creating a startup configuration file*

Q: Who can interact with monitored consoles?

- Permissio
  - CMS file,
- Example:



What about: “Live” data view capacity and disk-resident log data retention?

- Embedded default for “live” data view of console activity
  - One z/VM data space per monitored console
  - Default capacity of 1MB
  - Refer to the Admin Guide, **`DEFDSPS`** configuration parameter if 1MB is not sufficient

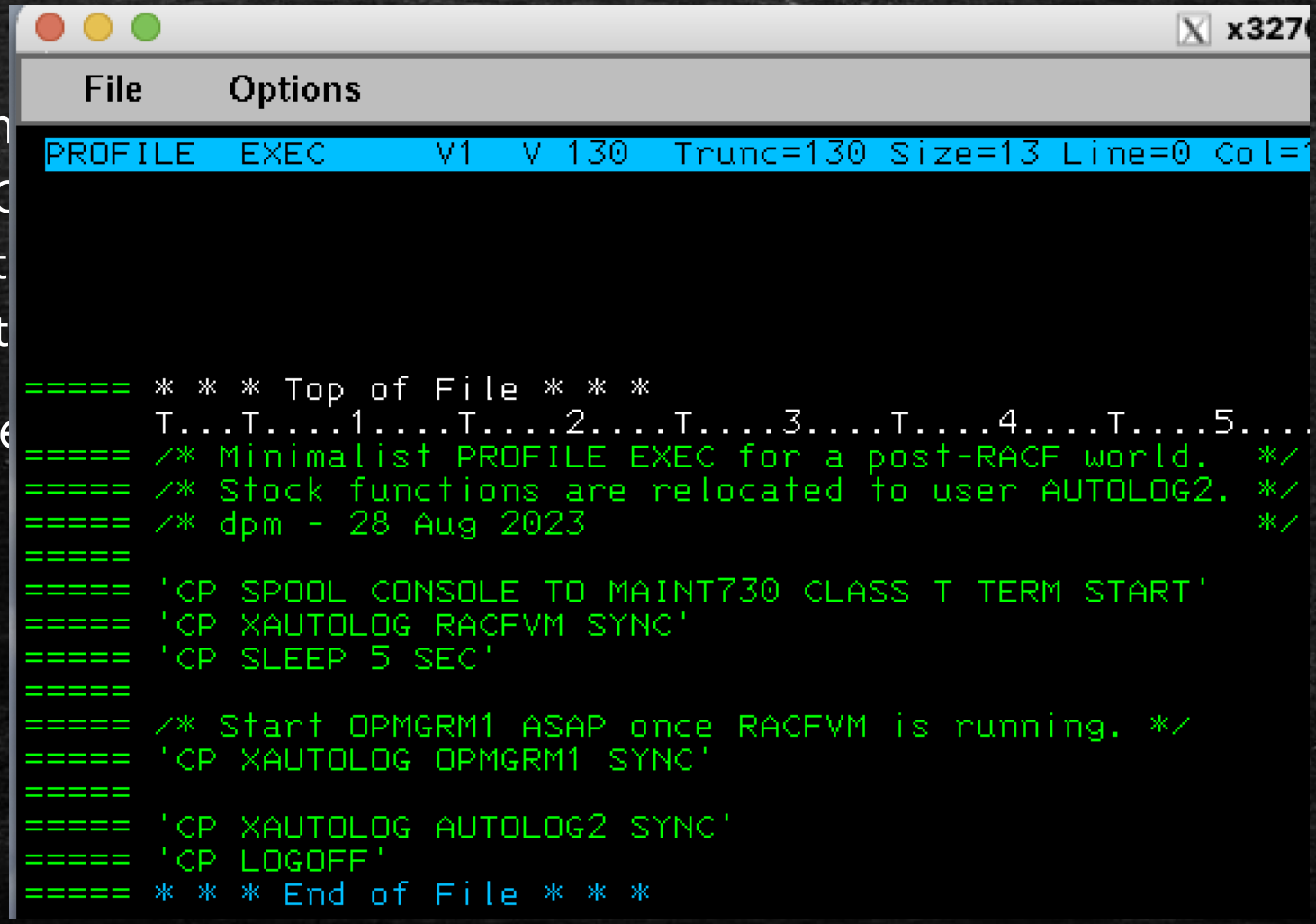
- Embedded default: CMS file log retention
  - One file per day, ***`sysname yyyymmdd`***, on OPMGRM1 minidisk 194
  - Daily “pruning” controlled via ***`GOMCLG EXEC`*** on OPMGRM1 minidisk 400
    - *Default: 50-cylinder 194 minidisk; enlarge if required*
    - *Option: LOCALMOD to revise / replace GOMCLG EXEC if incompatible with site requirements*
  - Refer to the Admin Guide, *Appendix E. Log File Management*

What about: Operations Manager and z/VM Initialization?

- Recommendation: Start early!
  - AUTOLOG1 (even with RACF…)
    1) Start RACFVM
    2) Start OPMGRM1 immediately after
- Example: PROFILE EXEC for AUTOLOG1

What about: Operations Manager and z/VM Initialization?

- Recomm
  - AUTOLO
    1) Start
    2) Start
- Example



5. HOROLOGIA FERREA.

Rota æqua ferrea ætheriſq; voluitur, Recludit æquè et hæc et illa tempora.

IBM Tape Manager: Preparing to support backup and recovery

- Before you start: Did you set up RMS?
  - Install, service, and configure DFSMS/VM RMS ("RMSMASTR" service virtual machine)
    - "RMSONLY" decision path through install documentation
  - Common pain points, based on support cases:
    - DGTVAUTH DATA: Add "Library Manager" SVM (usually TMLM1) as privileged RMS client
    - DGTVCNTL DATA: **`WORK_DIRECTORY`** parameter – may need to move from VMSYSU:DFSMS.WORK to alternate SFS location due to VMSYSU capacity constraints
    - DGTVCNTL DATA: Add **`RM_USE_GIVE Y`** (use CP GIVE for device hand-off)
      - Requires PTF UM35220 (service for VM66072)
      - Also suggested: PTF UM35306 (service for VM66110) – RMSMASTR in ESA mode

IBM Tape Manager: Preparing to support backup and recovery

- Before you start, know…
  - Tape admin users
    - *Can be controlled via ESM*
  - Real tape device addresses and VTL subsystem associations
    - e.g. in examples, devices 4B0-4BF are associated with subsystem IBMVTL1
  - Media type[s], TS7700 categories

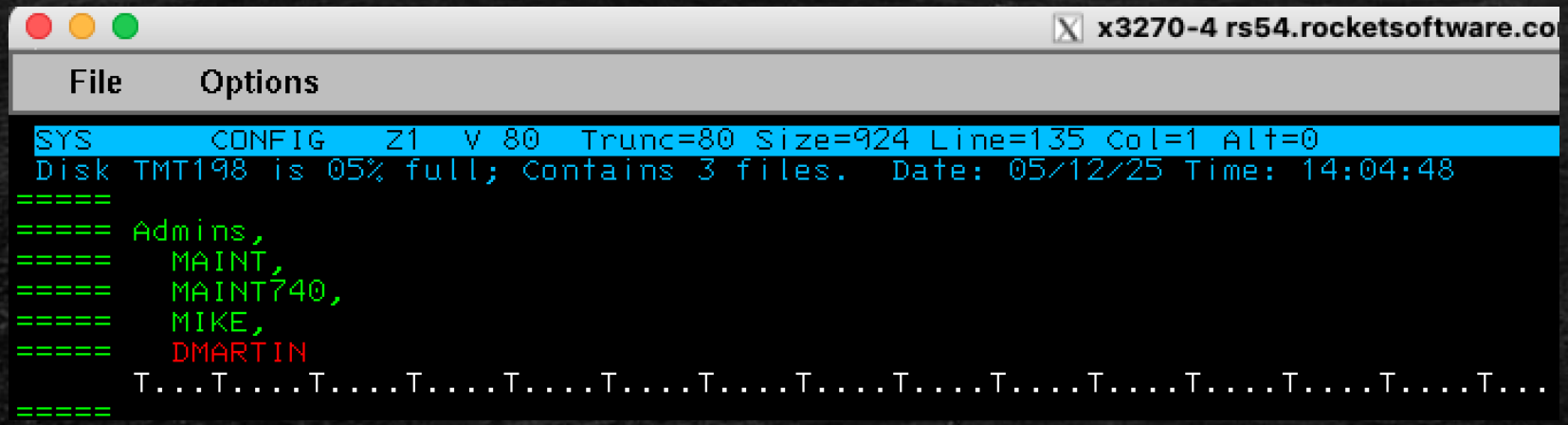
- And…
  - Prepare TMTMM, TMDMM, and TMLM1 A-disks per documentation
    - TMTMM: Primary Tape Manager SVM
    - TMDMM: "Device Manager Machine"
    - TMLM1: "Library Manager Machine"

IBM Tape Manager: Preparing to support backup and recovery

- Enable the product!
- IBM Tape Manager for z/VM – Memo to Users (LCD8-2860-00)
  - "SERVICE" command to register license entitlement in CP configuration
  - CP SET PRODUCT …
  - Details in this document

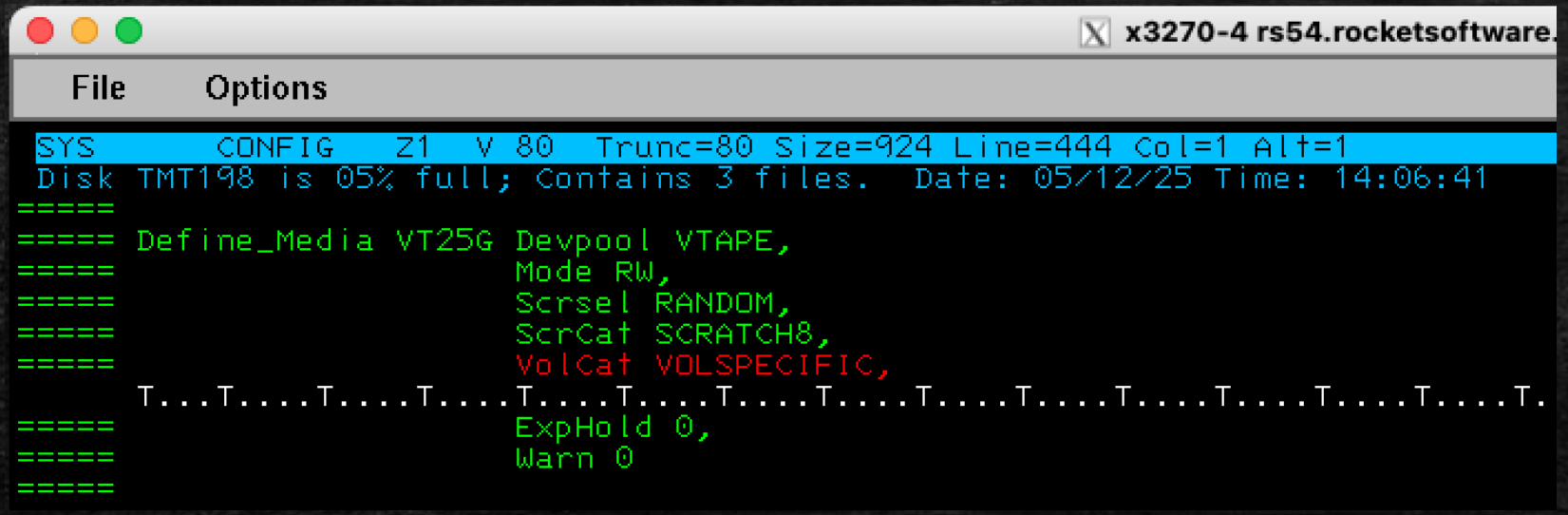
IBM Tape Manager: Preparing to support backup and recovery

- Simple "standard mode" configuration:
  - Start with "**STDMODE CONFSAMP**" on 5697J08C minidisk 2C2
  - Deploy as "**SYS CONFIG**" on TMTMM minidisk 198
  - Define "ADMIN" users:



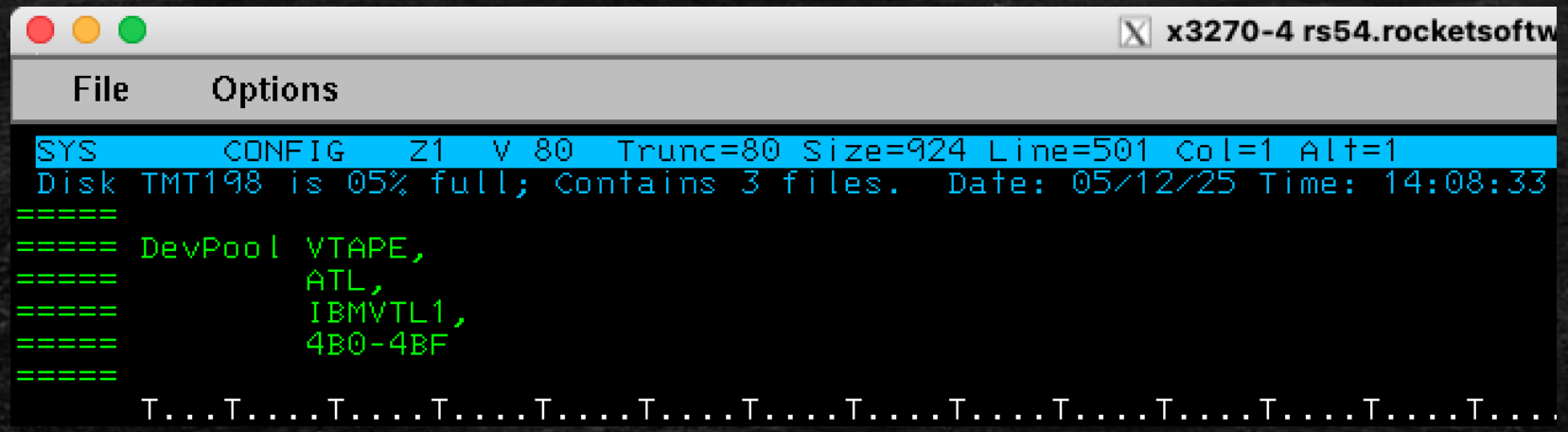
IBM Tape Manager: Preparing to support backup and recovery

- Simple "standard mode" configuration:
  - Start with "**STDMODE CONFSAMP**" on 5697J08C minidisk 2C2
  - Deploy as "**SYS CONFIG**" on TMTMM minidisk 198
  - Define at least one media type:



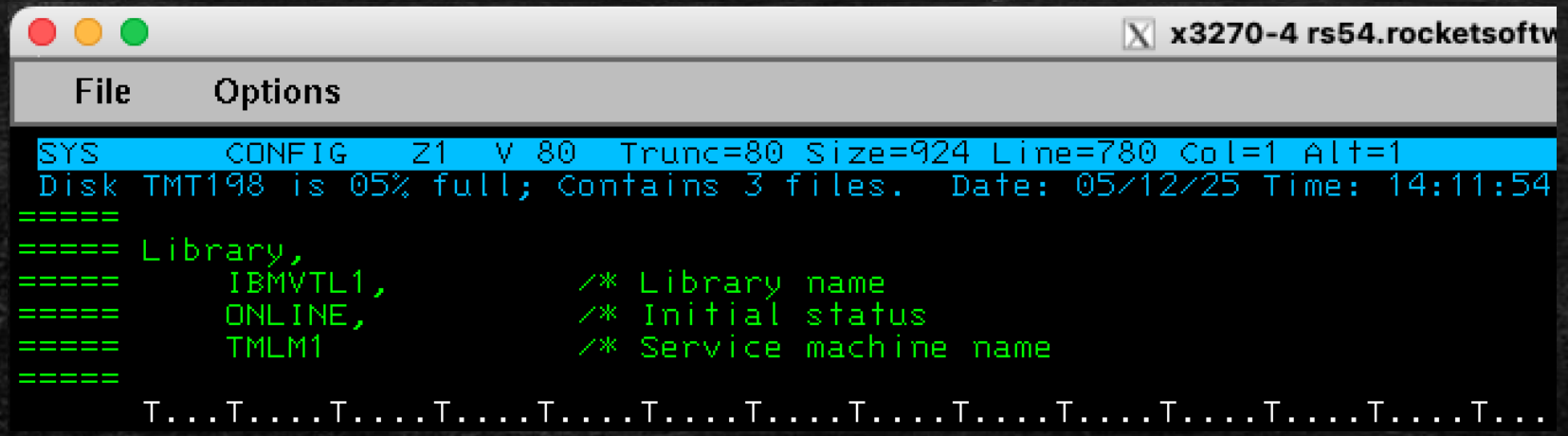
IBM Tape Manager: Preparing to support backup and recovery

- Simple "standard mode" configuration:
  - Start with "**STDMODE CONFSAMP**" on 5697J08C minidisk 2C2
  - Deploy as "**SYS CONFIG**" on TMTMM minidisk 198
  - Define a Device Pool to represent VTS drives:



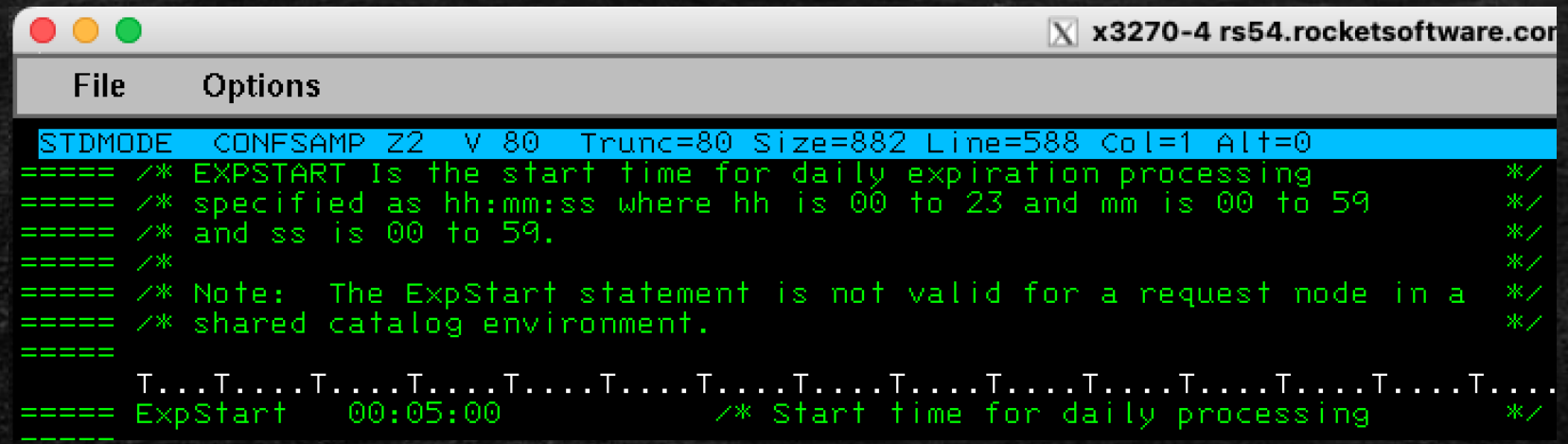
IBM Tape Manager: Preparing to support backup and recovery

- Simple "standard mode" configuration:
  - Start with "**STDMODE CONFSAMP**" on 5697J08C minidisk 2C2
  - Deploy as "**SYS CONFIG**" on TMTMM minidisk 198
  - Define the VTS subsystem and associated Library Manager SVM



IBM Tape Manager: Preparing to support backup and recovery

- Simple "standard mode" configuration:
  - Start with "**STDMODE CONFSAMP**" on 5697J08C minidisk 2C2
  - Deploy as "**SYS CONFIG**" on TMTMM minidisk 198
  - Set the daily schedule for "start-of-new-day" processing



IBM Tape Manager: Provision resources to support Backup & Restore Manager

- Recommendation:
  - ***Don't*** use the system scratch pool for Backup & Restore Manager media
  - ***Do*** define a dedicated scratch pool for Backup & Restore Manager media
- 1) "Scratch" pool initially holds **all** volumes allocated for backup
- 2) "In use" pool will hold in-use volumes owned by backup
  - As scratch mount requests are serviced, volumes move from "scratch" to "in use"
  - Once in-use volumes age past their expiration date, they migrate back to "scratch"

IBM Tape Manager: Provision resources to support Backup & Restore Manager

- Define scratch pool
- Assign scratch volumes to the newly-created scratch pool
- Set permissions for users of the newly-created scratch pool

…Then…

- Define in-use pool
- Volumes automatically assigned during scratch mount processing
- Set permissions for users of the newly-created in-use pool

IBM Tape Manager: Provision resources to support Backup & Restore Manager

- Define scratch pool:
- **TAPCMD POOLDEF BKRADMIN VTSCR MEDIA VT25G TAPEWARN 90…**
  … RETNMAX 999

- Assign scratch volumes to the newly-created pool:
- **TAPCMD TAPEADD VOL BKR001-BKR100 POOL BKRADMIN VTSCR…**
  … MEDIA VT25G ATL *IBMVTL1*

- Set permissions:
- **TAPCMD POOLACC BKRADMIN VTSCR USER BKRADMIN ADMN**
- **TAPCMD POOLACC BKRADMIN VTSCR USER *<svm_id>* TAPE**
  - ***…for BKRCATLG BKRBKUP BKRWRK01 BKRWRK02 BKRWRK03 BKRWRK04***

IBM Tape Manager: Provision resources to support Backup & Restore Manager

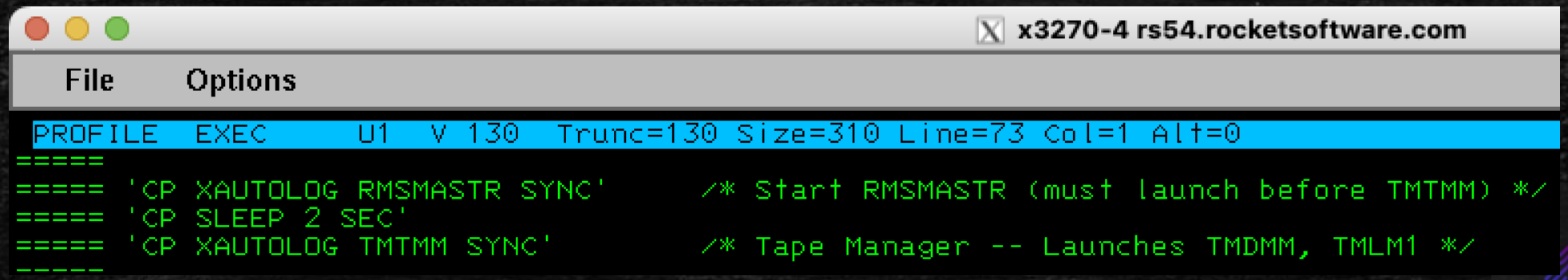
- Define "In-Use" pool:
- **`TAPCMD POOLDEF BKRADMIN BKRPOOL MEDIA VT25G FREEPOOL BKRADMIN VTSCR RETNMAX 999`**

- Volumes automatically assigned during scratch mount processing
- Set permissions:
- **`TAPCMD POOLACC BKRADMIN BKRPOOL USER BKRADMIN ADMN`**
- **`TAPCMD POOLACC BKRADMIN BKRPOOL USER <svm_id> TAPE`**
  - *…for BKRCATLG BKRBKUP BKRWRK01 BKRWRK02 BKRWRK03 BKRWRK04*

What about: Tape Manager and z/VM Initialization?

- Recommendation: Start after RACFVM, OPMGRM1, SFS file pool servers, etc… but **before** starting anything that requests tape services.
- **NOTE**: Start RMSMASTR first!
  - ***Also note:*** RMSMASTR initialization will fail if tape devices are unavailable

AUTOLOG2 (z/VM with RACF):



IBM Backup & Restore Manager: “A place for my stuff.”

IBM Backup & Restore Manager: Stop. Think. Decide.

- Proposition: As technologists, most of us prefer to work with problems that are susceptible to logical, rational solutions…
  - *…unlike policy.*

- Caveat: Be sure you understand the policy requirements before implementing a backup scheme.

IBM Backup & Restore Manager: Beginning of the beginning

- Before you start, know…
  - Backup administrator users
    - *Can be controlled via ESM; examples assume user BKRADMIN*
  - Policy requirements: Backup frequency and data retention
    - *"What do I need to back up, where do I put it, how long do I keep it?"*

- …and…
  - Complete basic installation tasks
    - Prepare all Backup and Restore Manager ("BKR") service virtual machine A-disks
    - Recommendation: Provision a dedicated SFS file pool server for the backup catalog
      - *See: https://www.ibm.com/products/backup-and-restore-manager-for-zvm*

IBM Backup & Restore Manager: A simple “30-day moving window” scheme

- Task: Update SFS file pool SVMs to grant ADMIN authority
- Task: Review and customize BKRSYSTM CONFIG
- Task: Review and customize BKRUSERS NAMES
- Weekly FULL backup: SAMPFULL
  - Disk-to-tape, leverages previous Tape Manager customization
- Daily INCREMENTAL backup: SAMPINCR
  - Disk-to-disk; define BKRPOOL user and customize SAMPINCR DISKPOOL
- Automated operations: Catalog management and job scheduling

Deploying Backup & Restore Manager
Task: SFS file pool ADMIN authority

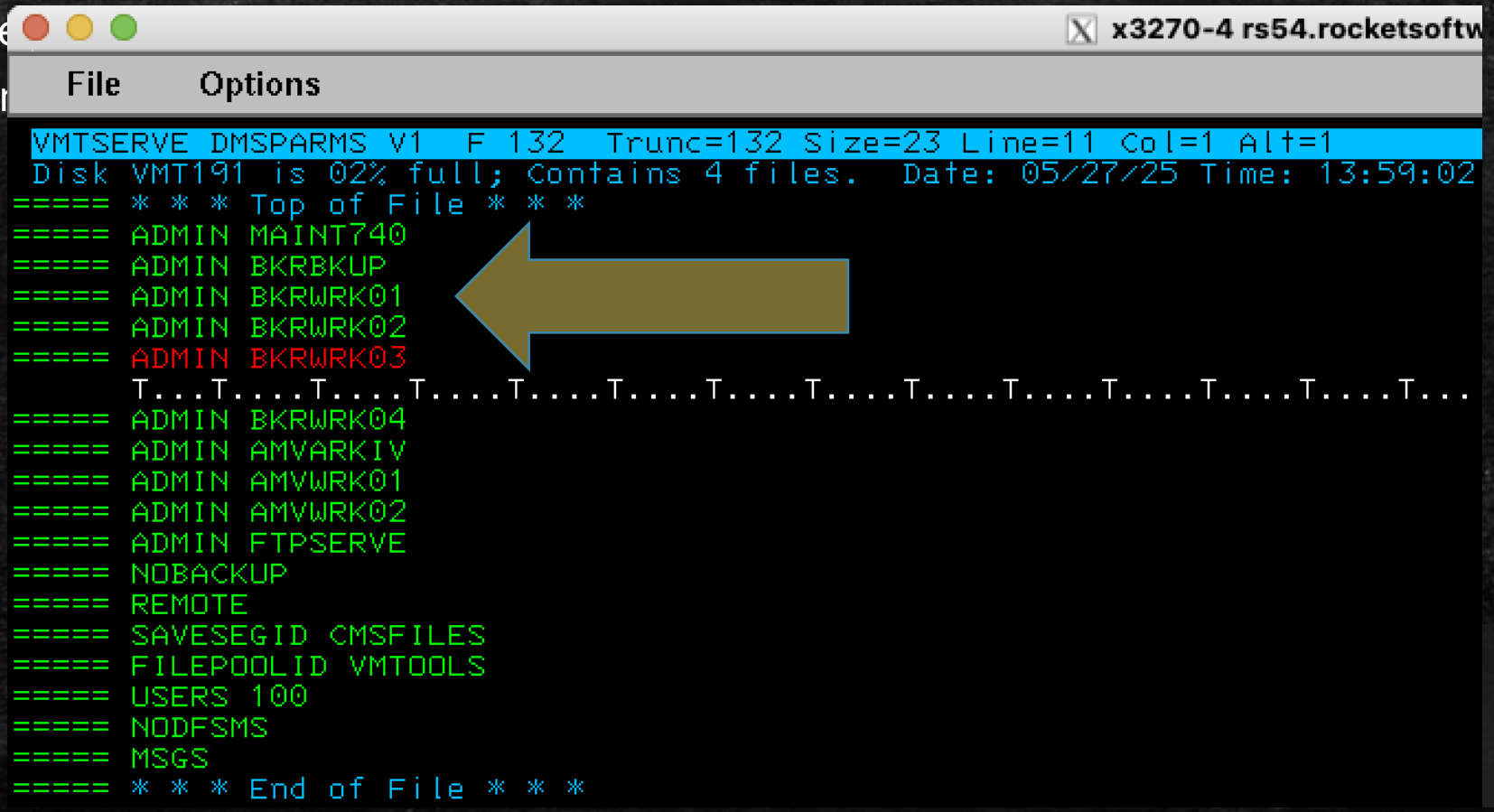
- Dynamic: From MAINT*vrm*, use CP SEND
- **CP SEND <sfs_srvr> GRANT ADMIN <bkr_srvr>**
  - ***Not*** persistent across IPL
  - Takes effect immediately

Deploying Backup & Restore Manager
Task: SFS file pool ADMIN authority

- Persistent: Update <*sfs_srvr*> DMSPARMS file
  - Takes effect *after* system IPL (or svm restart)
  - Example: VMTSERVE DMSPARMS (from my VMTSERVE 191 minidisk…)

Deploying Backup & Restore Manager
Task: SFS file pool ADMIN authority

- Persistent: Update <*sfs_srvr*> DMSPARMS file
  - Take
  - Exar



Deploying Backup & Restore Manager
Task: Review and customize BKRSYSTM CONFIG

- Start with: BKRSYSTM CONFSAMP (found on 5697J06C 2C2)
- Deploy as: BKRSYSTM CONFIG (located on BKRBKUP 198)
- Review / revise: Tape Manager handshaking
  - **TAPE_Handled_Via_EUM = EUM**
  - **EUM_Pool_Owner = BKRADMIN**
  - **EUM_Pool_Name = BKRPOOL**

Deploying Backup & Restore Manager
Task: Review and customize BKRSYSTM CONFIG

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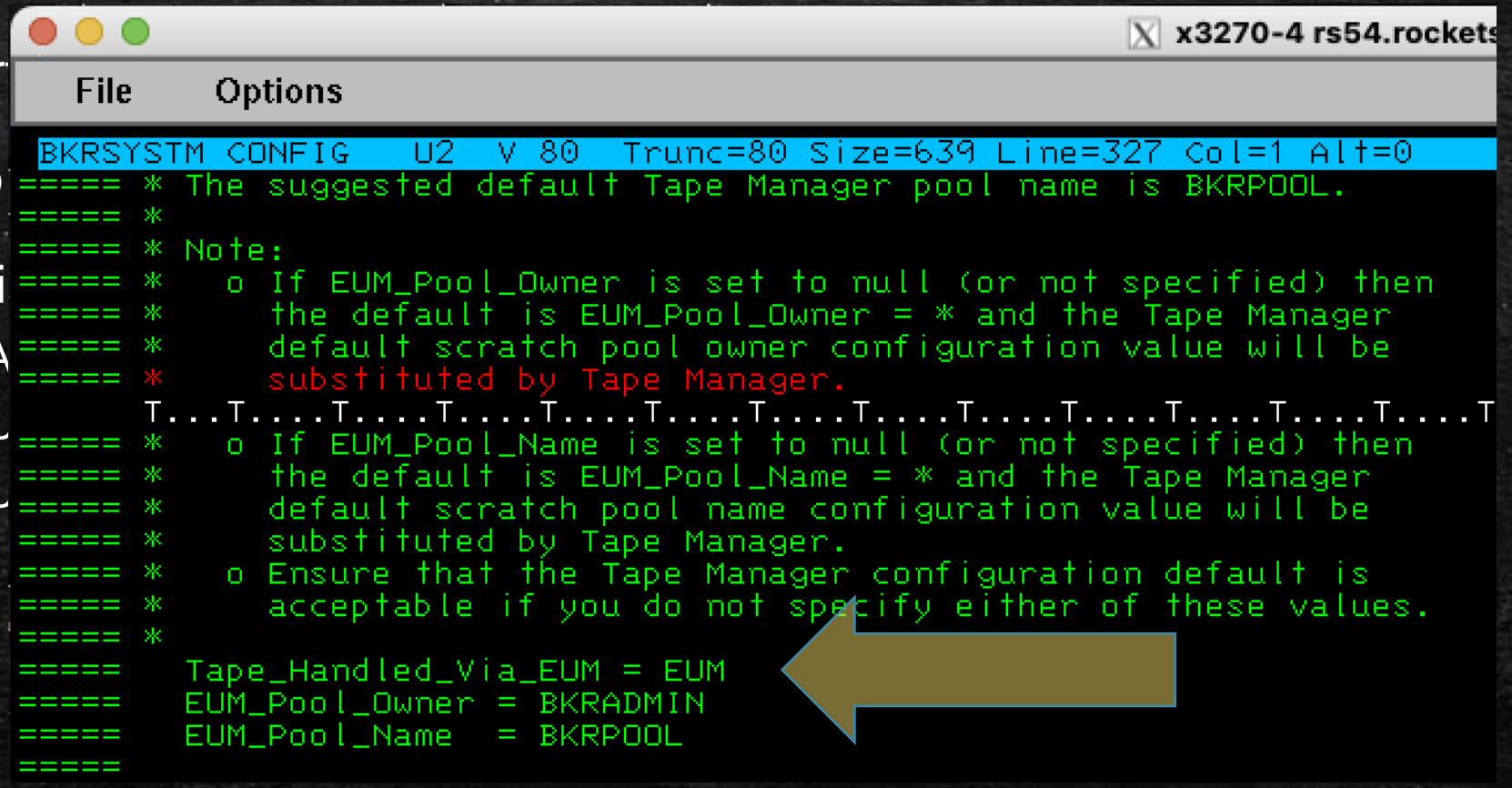

Deploying Backup & Restore Manager
Task: Review and customize BKRUSERS NAMES

- Start with: BKRUSERS NAMESAMP (found on 5697J06C 2C2)
- Deploy as: BKRUSERS NAMES (located on BKRBKUP 198)
- Review / revise: Admin user nomination
  - Add OPMGRM1 to enable automated scheduling
  - Add others as required
  - Follow rules for CMS "NAMES" file syntax

The sample BKRUSERS NAMES is a good place to start, but it needs a little attention. If you plan to automate via Operations Manager, add OPMGRM1 as a backup administrator.

Deploying Backup & Restore Manager
Task: Review and customize BKRUSERS NAMES

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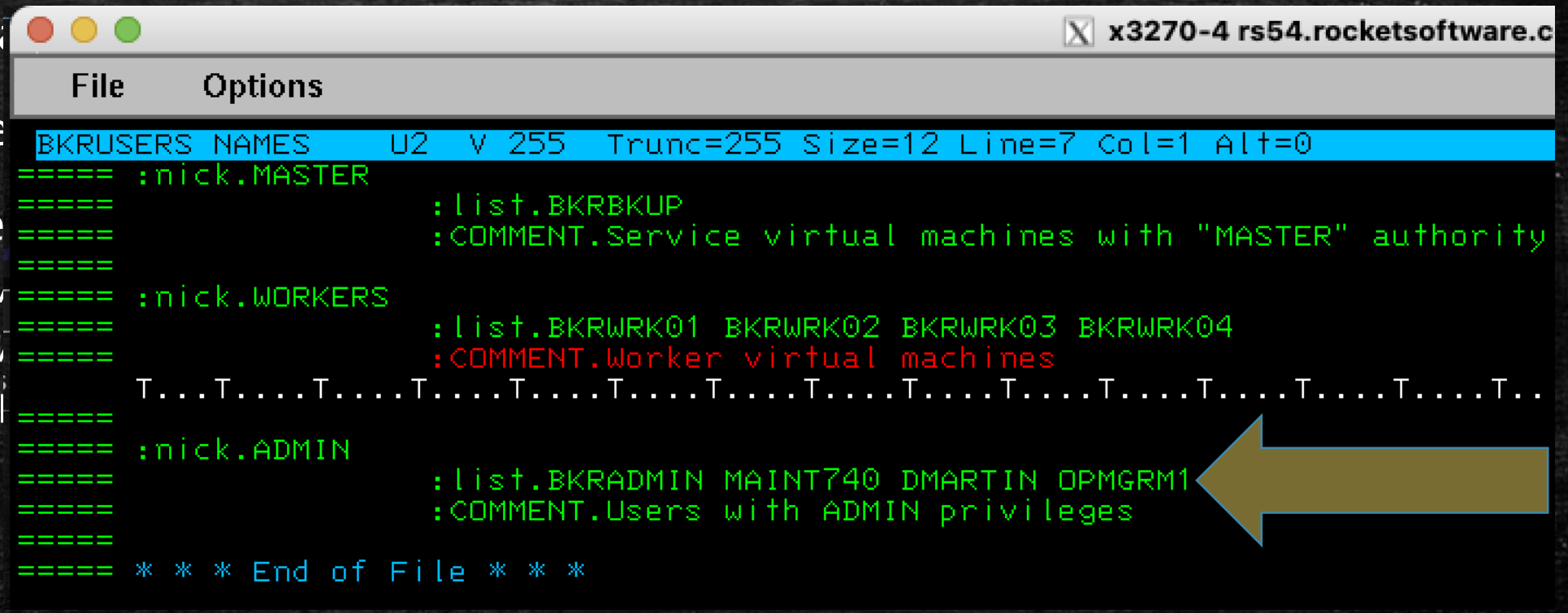

Deploying Backup & Restore Manager Weekly FULL backup SAMPFULL

- Start with: SAMPFULL TEMPSAMP (found on 5697J06C 2C2)
- Deploy as: SAMPFULL TEMPLATE (located on BKRBKUP 199)
- Review / revise: Resource selections after the Job_Header statement
  - Answers the question "What do I want to back up?"
- Recommendation:
  - After customization, use the BKRBKUP "REVIEW" command to validate selection criteria.

Most of the hard technical decision making involves identifying DASD resources to be backed up. This is another case of "sooner or later, you better know something."

In this case, "something" is details of the DASD subsystem essential to your day to day use of z/VM. What's important enough to be worth backing up? Which users? Which real DASD volumes? Which SFS file pools are involved?

Deploying Backup & Restore Manager
Weekly FULL backup SAMPFULL

x3270-4 rs54.rocketsoftware.com

File Options

```
SAMPFULL TEMPLATE R2  V 107  Trunc=107 Size=176 Line=114 Col=1 Alt=3
Disk BKR199 is 02% full; Contains 3 files.  Date: 05/27/25 Time: 13:23:41
=====                                                  Extent      Extent      Extent
=====   Function  MediaType   Owner      VDEV Volser DevType     Start       End         Size        RESERVED
=====  |----------|----------|--------|--|----|------|--------|--|----------|--|----------|--|----------|--------|
=====
=====   Include   Minidisk   *        =  *    *      *        =  *          =  *          =  *          *
=====   Exclude   Minidisk   FDISK    =  *    *      *        =  *          =  *          =  *          *
       T...T....T....T....T....T....T....T....T....T....T....T....T....T....T....T....T....T....T....1T....T.>
=====   Exclude   Minidisk   $ALLOC$  =  *    *      *        =  *          =  *          =  *          *
=====   Exclude   Minidisk   $PAGE$   =  *    *      *        =  *          =  *          =  *          *
=====   Exclude   Minidisk   $SPOOL$  =  *    *      *        =  *          =  *          =  *          *
=====   Exclude   Minidisk   BKRSVSFS =  *    *      *        =  *          =  *          =  *          *
=====   Include   Minidisk   BKRSVSFS =  0191 *      *        =  *          =  *          =  *          *
=====   Exclude   Minidisk   VMSERV*  =  *    *      *        =  *          =  *          =  *          *
=====   Include   Minidisk   VMSERV*  =  0191 *      *        =  *          =  *          =  *          *
=====
=====   FUNCTION  MEDIATYPE  POOLNAME  OWNER    FS
=====  |----------|----------|--------|--------|---|
=====
=====   Include   SFS        VMSYS:    *        SFS
=====   Include   SFS        VMSYSU:   *        SFS
=====   Include   SFS        VMPSFS:   *        SFS
=====   Include   SFS        BKRSFS:   *        SFS
=====   Exclude   SFS        BKRSFS:   BKRCATLG SFS
=====   Include   BFS        VMSYS:    *        BFS
=====   Exclude   BFS        VMSYS:    ROOT     BFS
=====
```

This is mostly straightforward. The one perhaps non-obvious part is handling of minidisk owned by SFS file pool server virtual machines. I don't want to back up most of the minidisks owned by file pool server – but I do want to back up their 191 mdisks, as those contain file pool server configuration settings. Remaining content is backed up as SFS / BFS resources

Note the individual MDISKs owned by file pool servers don't contain useful-to-humans data.

Deploying Backup & Restore Manager
Weekly FULL backup SAMPFULL

x3270-4 rs54.rocketsoftware.com

File Options

```
cp smsg bkrbkup review sampfull
 BKRBAK8529I Processing REVIEW SAMPFULL command for DMARTIN.
Ready;
RDR FILE 0139 SENT FROM BKRBKUP  PUN WAS 0141 RECS 0239 CPY  001 A NOHOLD NOKEEP
 BKRMAK8559I INCLUDE / EXCLUDE processing for job SAMPFULL selected 370 objects
 BKRMAK8559I for backup processing.
 BKRMAK8563I Worker count for job SAMPFULL has been set to 1.
 BKRMAK8568I CMS files will be filtered against file mask "* * *".
 BKRMAK8566I SFS filespaces will be filtered with path mask "*".
 BKRMAK9347I Worker selection will be handled by user exit BKREXI03 EXEC.
 BKRMAK9345I Job will be processed by:
 BKRMAK9346I ... BKRWRK01
 BKRMAK9648I Load Balancing NOT Applied. Default Options used: WEIGHTBY NONE / GROUPBY NONE
 BKRMAK8583I Sending results to DMARTIN for review.
 File SAMPFULL JOB D1 sent to DMARTIN at RS55 on 05/27/25 13:27:41
 Return code "0" from command REVIEW SAMPFULL at 05/27/25 13:27:41.
```

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x3270-4 rs54.rocketsoftware.c

File Options

```
 0139      PEEK      A0  V 80  Trunc=80 Size=494 Line=95 Col=1 Alt=0
File SAMPFULL JOB from BKRBKUP at RS55 Format is NETDATA.
JOB_HEADER
DUMPDYN $DIRECT$ 0A01 $$DRIVER$$
DUMPDYN $DIRECT$ 0B01 $$DRIVER$$
DUMPDYN $SYSCKP$ 0A01 $$DRIVER$$
DUMPDYN $SYSWRM$ 0A01 $$DRIVER$$
DUMPDYN AUDITOR 0191 $$DRIVER$$
DUMPDYN AUTOLOG1 0191 $$DRIVER$$
DUMPDYN AUTOLOG2 0191 $$DRIVER$$
DUMPDYN AVSVM 0191 $$DRIVER$$
DUMPDYN BKRADMIN 0191 $$DRIVER$$
DUMPDYN BKRBKUP 0191 $$DRIVER$$
DUMPDYN BKRBKUP 0198 $$DRIVER$$
DUMPDYN BKRBKUP 0199 $$DRIVER$$
DUMPDYN BKRBKUP 0591 $$DRIVER$$
DUMPDYN BKRBKUP 0592 $$DRIVER$$
DUMPDYN BKRCATLG 0191 $$DRIVER$$
DUMPDYN BKRPOOL 5501 $$DRIVER$$
DUMPDYN BKRPOOL 5502 $$DRIVER$$
DUMPDYN BKRSVSFS 0191 $$DRIVER$$
DUMPDYN BKRWRK01 0191 $$DRIVER$$
DUMPDYN BKRWRK02 0191 $$DRIVER$$
DUMPDYN BKRWRK03 0191 $$DRIVER$$
DUMPDYN BKRWRK04 0191 $$DRIVER$$
DUMPDYN BLDCMS 0191 $$DRIVER$$
DUMPDYN BLDNUC 0191 $$DRIVER$$
DUMPDYN BLDRACF 0191 $$DRIVER$$
DUMPDYN BLDSEG 0191 $$DRIVER$$
DUMPDYN CBDIODSP 0191 $$DRIVER$$
DUMPDYN CBDIODSP 0400 $$DRIVER$$
DUMPDYN CMSBATCH 0195 $$DRIVER$$
DUMPDYN CSMSERVE 0191 $$DRIVER$$
DUMPDYN DATAMOVE 05F0 $$DRIVER$$
DUMPDYN DATAMOVE 05FF $$DRIVER$$
DUMPDYN DATAMOVE 0155 $$DRIVER$$
DUMPDYN DATAMOVE 01AA $$DRIVER$$
DUMPDYN DATAMOVE 01FA $$DRIVER$$
1= Help      2= Add line  3= Quit      4= Tab       5= Clocate     6= ?/Change
7= Backward  8= Forward   9= Receive  10= Rgtleft 11= Spltjoin   12= Cursor

====>
```

The job generated by REVIEW isn't really intended as a human-friendly interface, but it's straightforward enough to identify assets by owning virtual machine name and virtual device address. It's worth checking this against what you expected to accomplish via INCLUDE / EXCLUDE filters.

Deploying Backup & Restore Manager Daily INCREMENTAL backup SAMPINCR

- Start with: SAMPINCR TEMPSAMP (found on 5697J06C 2C2)
- Deploy as: SAMPINCR TEMPLATE (located on BKRBKUP 199)
- Considerations are similar to SAMPFULL
  - CMS-native data only (EDF minidisk, SFS file spaces)
    - ***Not*** applicable to DASD image backup
  - "Differential incremental", ***not*** "Cumulative incremental"
    - *Each SAMPINCR execution binds to most recent SAMPFULL as baseline reference*
- This example: Weekly to tape, daily to CMS minidisk
  - Provision "BKRPOOL" skeleton user as backup media owner
  - List minidisks in "SAMPINCR DISKPOOL" on BKRBKUP 199

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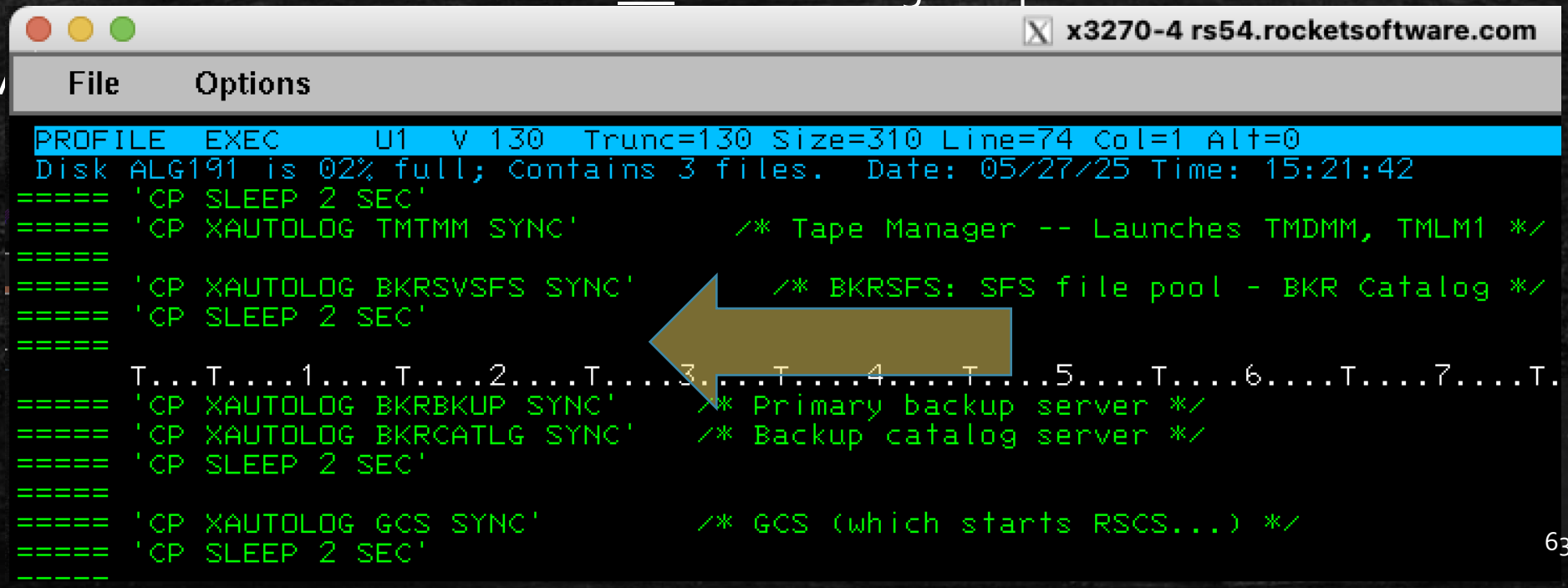
```
x3270-4 rs54.rocketsc
File      Options
BKRPOOL   DIRECT    A0   F 80   Trunc=72 Size=14 Line=5 Col=1 Alt=0

===== * * * Top of File * * *
===== USER BKRPOOL NOLOG 16M 256M G
===== *
===== * BKR - DISKPOOL minidisk owner - 9 Aug 2021 - dpm
===== *
===== * NOLOG user - owner of minidisks used by RS55 production BKR
      T...T....T....T....T....T....T....T....T....T....T....T....T....T.
===== * (BKRADMIN / BKRBKUP / BKRCATLG / BKRWRK01-04) instance.
===== *
===== *
=====    INCLUDE USERPROF
=====    ACCOUNT 0 BKRPROD
===== *
=====    MDISK 5501 3390 1 END V55U03 MR
=====    MDISK 5502 3390 1 END V55U04 MR
===== *DVHOPT LNK0 LOG1 RCM1 SMS0 NPW1 LNGAMENG PWC20221213 CRC~ñ
===== * * * End of File * * *
====>

SAMPINCR DISKPOOL U1   V 80   Trunc=80 Size=2 Line=0 Col=1 Alt=0

===== * * * Top of File * * *
      T...T....T....T....T....T....T....T....T....T....T....T....T....T.
===== BKRPOOL 5501
===== BKRPOOL 5502
===== * * * End of File * * *
```

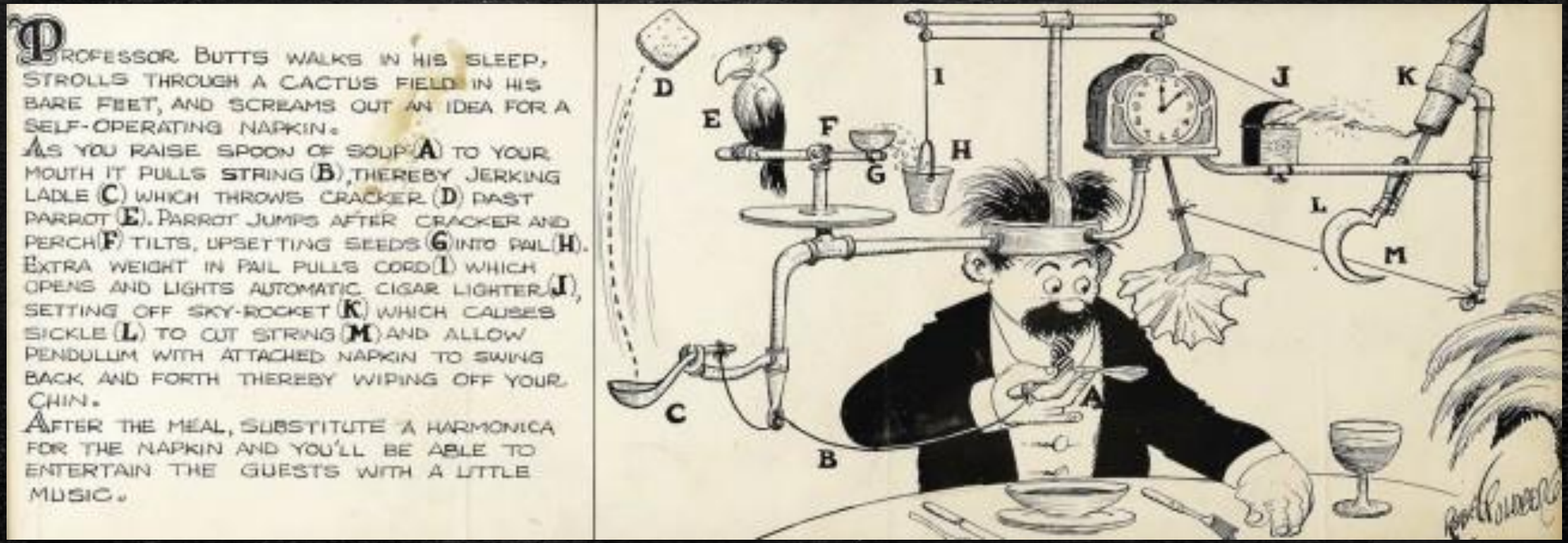
Rocket software

What about: Backup & Restore Manager and z/VM Initialization?

- Recommendation: Start after RACFVM, OPMGRM1, and Tape Manager
- **NOTE**: Start the Backup Catalog SFS file pool server first!
  - BKRCATLG initialization will fail if the catalog file space is unavailable



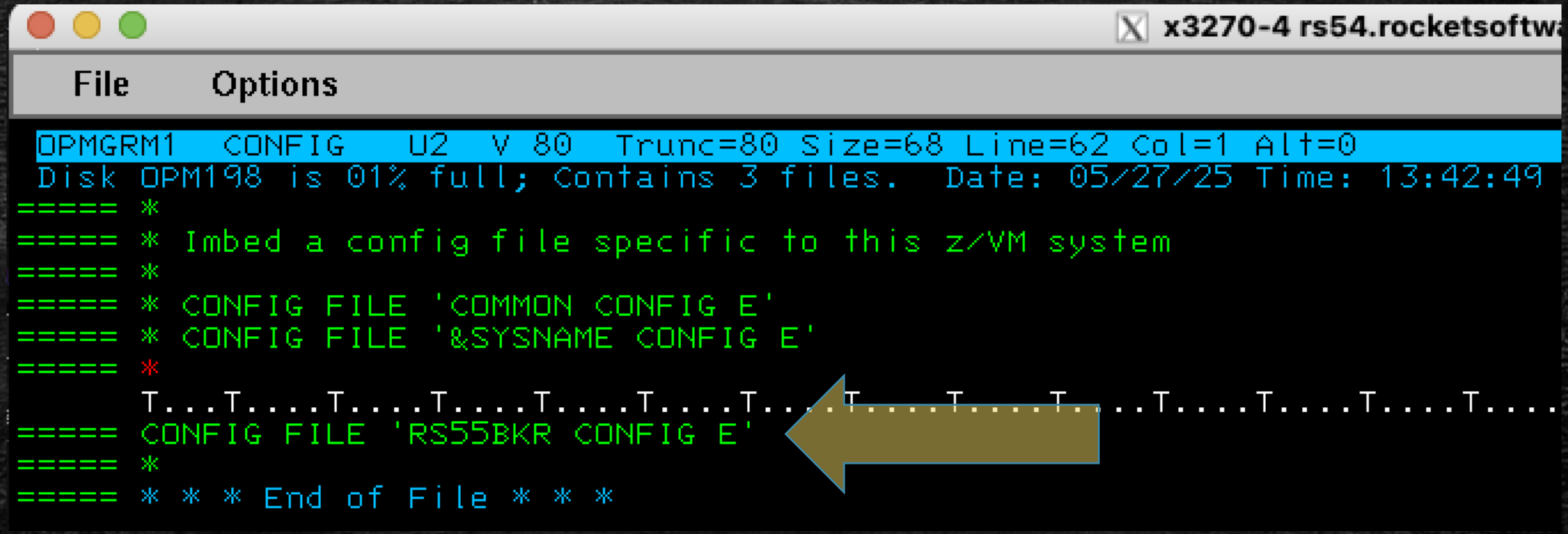
A pinch of automation:
“Let’s tie all this stuff together!”



IBM Operations Manager 2 of 2: An added pinch of automation

- 30-day "moving window" backup per prior examples
- On TMTMM 198 (TMTMM configuration file SYS CONFIG):
  - `EXPSTART 00:05:00`
- On OPMGRM1 minidisk 198
  - Add a new line at bottom of OPMGRM1 CONFIG…
  - `CONFIG FILE 'BKRSCHED CONFIG E'`
  - …and then, create a new file BKRSCHED CONFIG
    - Daily: BKRCATLG housekeeping via "EXPIRE (PURGE" at 01:00
    - Sunday: Full system backup to tape via BKRBKUP "SUBMIT SAMPFULL" at 04:00
    - Mon-Sat: Daily incremental backup to tape via BKRBKUP "SUBMIT SAMPINCR" at 04:00

IBM Operations Manager 2 of 2: An added pinch of automation



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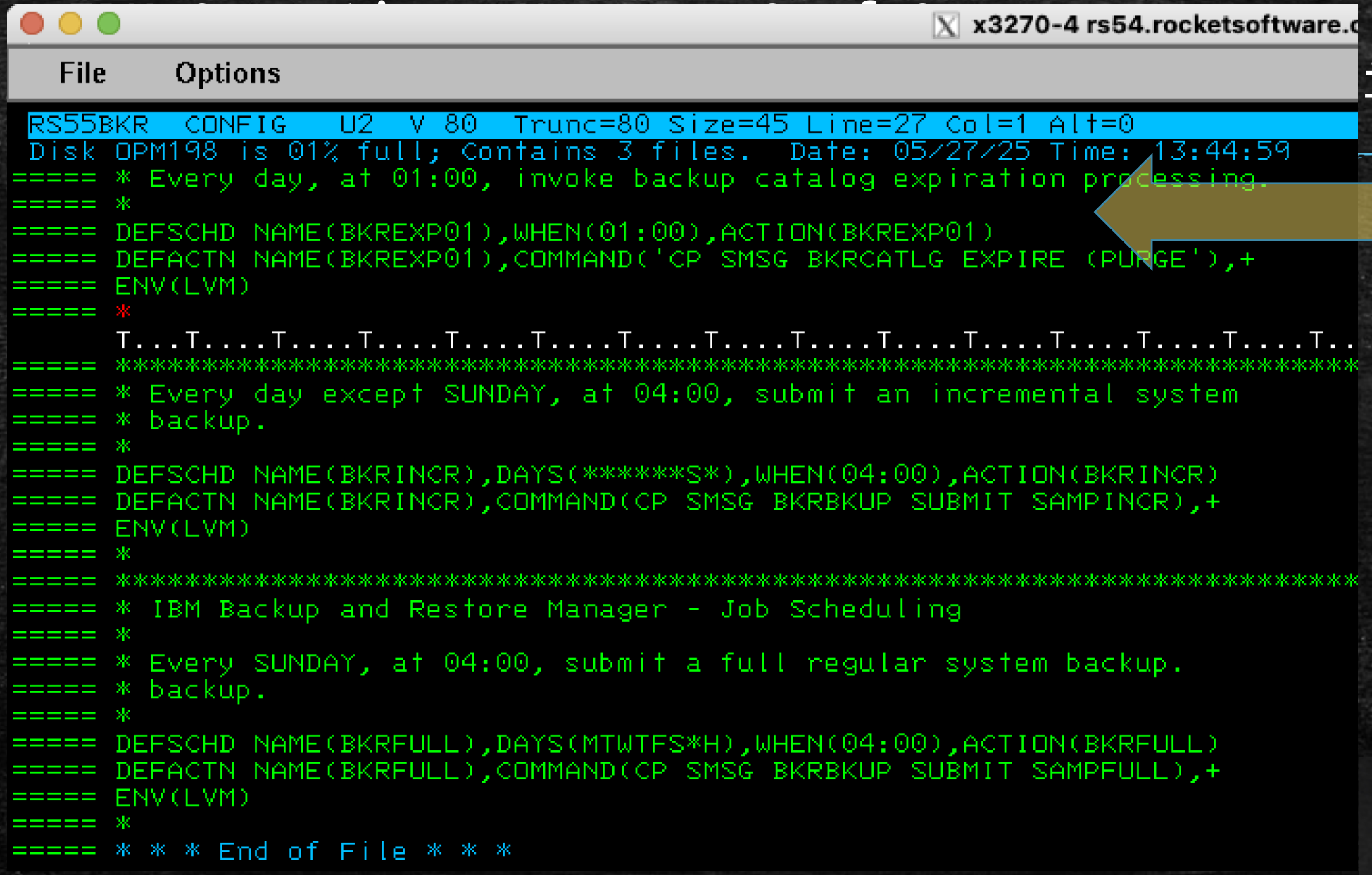
x3270-4 rs54.rocketsoftware.c
File
Options
RS55BKR CONFIG U2 V 80 Trunc=80 Size=45 Line=27 Col=1 Alt=0
Disk OPM198 is 01% full; Contains 3 files. Date: 05/27/25 Time: 13:44:59
***** * Every day, at 01:00, invoke backup catalog expiration processing.
***** *
***** DEFSCHD NAME(BKREXP01),WHEN(01:00),ACTION(BKREXP01)
***** DEFACTN NAME(BKREXP01),COMMAND('CP SMSG BKRCATLG EXPIRE (PURGE'),+
***** ENV(LVM)
***** *
T...T....T....T....T....T....T....T....T....T....T....T....T....T....T..
***** **
***** * Every day except SUNDAY, at 04:00, submit an incremental system
***** * backup.
***** *
***** DEFSCHD NAME(BKRINCR),DAYS(******S*),WHEN(04:00),ACTION(BKRINCR)
***** DEFACTN NAME(BKRINCR),COMMAND(CP SMSG BKRBKUP SUBMIT SAMPINCR),+
***** ENV(LVM)
***** *
***** **
***** * IBM Backup and Restore Manager - Job Scheduling
***** *
***** * Every SUNDAY, at 04:00, submit a full regular system backup.
***** * backup.
***** *
***** DEFSCHD NAME(BKRFULL),DAYS(MTWTFS*H),WHEN(04:00),ACTION(BKRFULL)
***** DEFACTN NAME(BKRFULL),COMMAND(CP SMSG BKRBKUP SUBMIT SAMPFULL),+
***** ENV(LVM)
***** *
***** * * * End of File * * *

ing

x3270-4 rs54.rocketsoftware.c

File Options

```
RS55BKR  CONFIG   U2  V 80  Trunc=80 Size=45 Line=27 Col=1 Alt=0
 Disk OPM198 is 01% full; Contains 3 files.  Date: 05/27/25 Time: 13:44:59
===== * Every day, at 01:00, invoke backup catalog expiration processing.
===== *
===== DEFSCHD NAME(BKREXP01),WHEN(01:00),ACTION(BKREXP01)
===== DEFACTN NAME(BKREXP01),COMMAND('CP SMSG BKRCATLG EXPIRE (PURGE'),+
===== ENV(LVM)
===== *
      T...T....T....T....T....T....T....T....T....T....T....T....T....T....T..
===== ********************************************************************************
===== * Every day except SUNDAY, at 04:00, submit an incremental system
===== * backup.
===== *
===== DEFSCHD NAME(BKRINCR),DAYS(******S*),WHEN(04:00),ACTION(BKRINCR)
===== DEFACTN NAME(BKRINCR),COMMAND(CP SMSG BKRBKUP SUBMIT SAMPINCR),+
===== ENV(LVM)
===== *
===== ********************************************************************************
===== * IBM Backup and Restore Manager - Job Scheduling
===== *
===== * Every SUNDAY, at 04:00, submit a full regular system backup.
===== * backup.
===== *
===== DEFSCHD NAME(BKRFULL),DAYS(MTWTFS*H),WHEN(04:00),ACTION(BKRFULL)
===== DEFACTN NAME(BKRFULL),COMMAND(CP SMSG BKRBKUP SUBMIT SAMPFULL),+
===== ENV(LVM)
===== *
===== * * * End of File * * *
```

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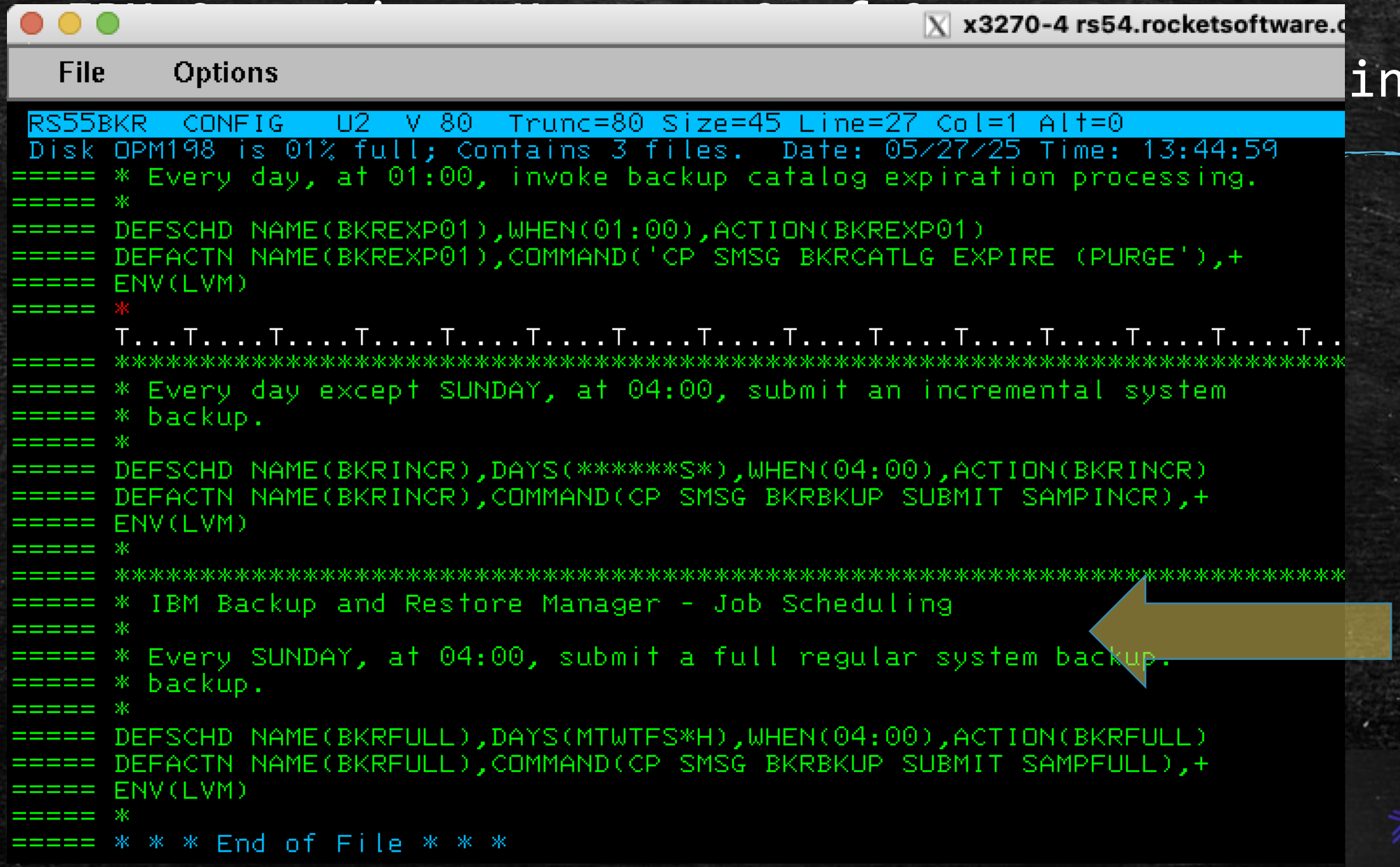
x3270-4 rs54.rocketsoftware.c
File
Options
RS55BKR CONFIG U2 V 80 Trunc=80 Size=45 Line=27 Col=1 Alt=0
Disk OPM198 is 01% full; Contains 3 files. Date: 05/27/25 Time: 13:44:59
===== * Every day, at 01:00, invoke backup catalog expiration processing.
===== *
===== DEFSCHD NAME(BKREXP01),WHEN(01:00),ACTION(BKREXP01)
===== DEFACTN NAME(BKREXP01),COMMAND('CP SMSG BKRCATLG EXPIRE (PURGE'),+
===== ENV(LVM)
===== *
T...T....T....T....T....T....T....T....T....T....T....T....T....T....T..
===== **
===== * Every day except SUNDAY, at 04:00, submit an incremental system
===== * backup.
===== *
===== DEFSCHD NAME(BKRINCR),DAYS(******S*),WHEN(04:00),ACTION(BKRINCR)
===== DEFACTN NAME(BKRINCR),COMMAND(CP SMSG BKRBKUP SUBMIT SAMPINCR),+
===== ENV(LVM)
===== *
===== **
===== * IBM Backup and Restore Manager - Job Scheduling
===== *
===== * Every SUNDAY, at 04:00, submit a full regular system backup.
===== * backup.
===== *
===== DEFSCHD NAME(BKRFULL),DAYS(MTWTFS*H),WHEN(04:00),ACTION(BKRFULL)
===== DEFACTN NAME(BKRFULL),COMMAND(CP SMSG BKRBKUP SUBMIT SAMPFULL),+
===== ENV(LVM)
===== *
===== * * * End of File * * *

IBM Operations Manager 2 of 2: An added pinch of automation

- Optionally, consider…
  - System SPOOL and PAGE occupancy monitoring
  - Automatic restart for select service virtual machines
    - *Beware of collisions with AUTOLOG1 / AUTOLOG2 at IPL time*

“It’s like clockwork”

- Operations Manager: Automated console management, system state monitoring, event scheduling, and event response.
- Tape Manager: Tape storage subsystem resource provisioning and management.
- Backup & Restore Manager: z/VM data backup and recovery.

Links to useful resources

- The z/VM Library:
  https://www.vm.ibm.com/library
- Product "home" pages
  - IBM Operations Manager for z/VM:
    https://www.ibm.com/products/operations-manager-for-zvm
  - IBM Tape Manager for z/VM:
    https://www.ibm.com/products/tape-manager-for-zvm
  - IBM Backup and Restore Manager for z/VM:
    https://www.ibm.com/products/backup-and-restore-manager-for-zvm
- The IBMVM Listserv forum:
  https://listserv.uark.edu/archives/ibmvm.html

Questions, Comments, Feedback…?

- "I would rather have questions that cannot be answered than answers that cannot be questioned."

Richard Feynman (1918 – 1988), Theoretical Physicist

Title and Content Layout with List

- Add your first bullet point here
- Add your second bullet point here
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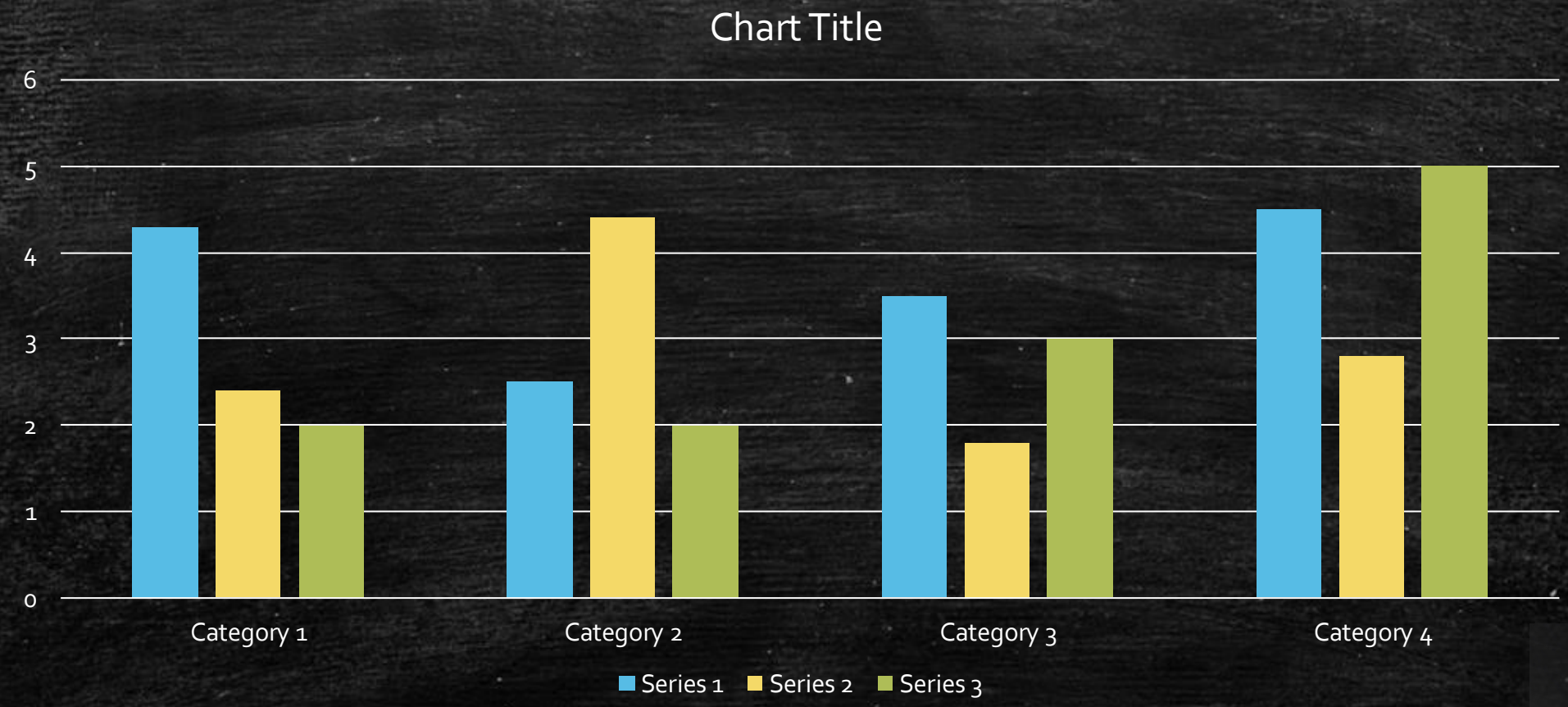
Title and Content Layout with Chart



Two Content Layout with Table

- First bullet point here
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- Third bullet point here

Class	Group A	Group B
Class 1	82	95
Class 2	76	88
Class 3	84	90

Two Content Layout with SmartArt

- Group A
  - Task 1
  - Task 2
- Group B
  - Task 1
  - Task 2
- Group C
  - Task 1

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- Second bullet point here
- Third bullet point here

Add a Slide Title - 1

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Add a Slide Title - 3

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