

Mike Robertson  
Rock River Water Reclamation District  
Rockford, Illinois

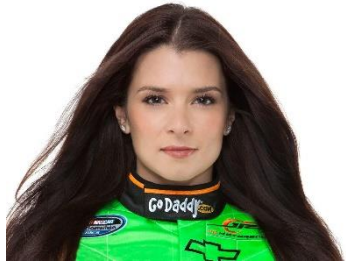
# VTAPE

“and the small VSE Shop”

© Nations Online Project



Cheap Trick  
Cheap Trick



Fastener Capital  
of  
the World



# Rock River Water Reclamation District (RRWRD)

- The Rock River Water Reclamation District protects public health and the environment through innovative and cost-effective wastewater and solid waste management.
- The District covers nearly 100 square miles of Winnebago County, Illinois. RRWRD serves people in the communities of Rockford, Loves Park, Machesney Park, Roscoe, Cherry Valley, New Milford, Winnebago, and a small portion of Rockton. Additionally, we serve some customers in rural Winnebago county and a few in neighboring counties.



# RRWRD Overview

- The District has over 1100 miles of pipe in its service territory.
- Our Plant is apx. 100 acres w/ a 25 million gallon reservoir.
- 24,000 manholes - District owned.
- 35 lift stations District wide.
- The District covers over 100+ square miles.
- The District serves over a quarter million customers.
- The District processes over 32 million gallons of waste water per day. (Capacity of 130 Million gallons at peak levels).
- Over 18,000 tons of fertilizer (Bio-Solids) produced for farming, produced annually.
- 60% of our energy to run our Plant comes from reusable Bio-Gas from the Plant (This is a saving of over \$750,000 per year).
- Our Lab performs over 60,000 sample analyses yearly.
- We collect over 4000 samples from over 1200 commercial/Industrial users yearly. Fats, Oils and Grease (FOG) is our biggest concern.



# RRWRD Overview

- 115 employees
  - Departments Include:
    - Accounting (A/P, General Accounting, Payroll, Purchasing)
    - Administration
    - Automotive Maintenance
    - Billing and Collections
    - Engineering
    - Industrial Waste Surveillance (Compliance Enforcement)
    - Information & Technology Services
    - Laboratory
    - Plant Maintenance
    - Plant Operations
    - Supporting Services (Sewer Maintenance)
- EPA Mandated
- 1 of 5 Agencies within Illinois that can license construction of Sanitary Sewers



# RRWRD Overview

- We televise over 300,000 feet of pipe yearly or average 60 miles.
- 5 year cycle for cleaning the 1100 miles of pipe or an average of 230 miles or over 1,000,000 feet per year.
- 180,000 feet of unscheduled cleanings per year.
- 80,000 accounts.
- Treated and billed for 6,500,000,000 Gallons of wastewater (last fiscal year)



# RRWRD POTW (Public Owned Treatment Works) aka Poop Plant!





## ***Moments in History (Mostly RRWRD & ITS)***

### **Early 1970s**

Significant Amendments to Clean Water Act  
Sewage Treatment Agencies must bill for usage  
Industry must pretreat (clean wastewater before discharging to sanitary sewer)  
RRWRD uses County Honeywell Computer, with programs from San Antonio Texas\*  
**\* According to Rumor**

Local Industry sues RRWRD for Method of Billing

### **Middle/Late 1970s**

RRWRD Lawsuit Settled  
More fair method for Billing (especially Industry that pretreats wastewater)  
“Quality/Quantity” is now an accepted practice (added to Clean Water Act)  
RRWRD acquires IBM 370/115, DOS/VS, MTCS, Cobol, VSAM

### **1980s**

RRWRD leases IBM 4361-3, 3370 DASD, 8809 Tape Drive, runs VSE, CICS, Cobol, VSAM  
**\*They shutdown computer at 4:00 PM (they close at 4:30 PM) and run backups**

3<sup>rd</sup> Party Terminals, few PCs sharing printer and some with a “IRMA” card to connect to 4361,  
IBM Office System/6

### **1990**

Me







## ***Moments in History (Mostly RRWRD & ITS)***

### **1992**

IBM 4361-5, 3380, 3420-8, VSE, CICS, COBOL, VSAM

Acquire Software/AG, ADABAS, Natural

Plan to modernize applications with a portable language  
then re-host

Outsource Payroll

Install LAN 150MB File Server (Netware 3), use ArcNet, Ethernet and Token Ring

Replace 3<sup>rd</sup> Party Terminals with 3278s (Color)

Connect to LAN to 4361 using Token Ring/Ethernet/ArcNet

Select PC/LAN based Financial Application



### **1993-1994**

IBM 3480 and 3430

HP 9000 for GIS

Begin testing Software/AG products under HP-UX, Plan to convert from IBM to HP

### **1995**

“Surprise” IBM PC Server/500 VSE, CICS, Cobol, VSAM, Natural, Adabas

***\*Both IBM and Software/AG have special pricing too good to pass up***

4mm DAT, SCSI 3480, 3420

TCP/IP, terminal emulation across RRWRD

Switch to all EtherNet

Begin implementation of Process Control System (PCS) aka SCADA





## ***Moments in History (Mostly RRWRD & ITS)***

**1998**

Replace PC Server/500 S390 with IS/390 VSE, CICS, Natural, Adabas, VSAM

**2000**

Y2K, Nothing

**2000-2008**

Additional Servers, Network, HP-UX replaced by Linux Host for GIS

Dell PowerVault (First SAN)

Automate rest of RRWRD Plant

Increase network

Add lots of Fiber

**2009**

New Administration Building, New Data Center

Dell EqualLogics replace PowerVault

**2009-2011**

SDLT replaces 4mm DAT on IS/390

UniversalSoft Virtual Tape Appliance (VTA) added to IS/390 (Bus & Tag Connection)

SDLT replaced by Disk to Disk (Dell EqualLogic SAN) to SDLT Library under Syncsort Backup Express (BEX)





## ***Moments in History (Mostly RRWRD & ITS)***

**2011**

Begin looking at new hosts to replace IS/390



**2012**

z114 (great pricing), running zVM, zVSE, CICS, Natural, Adabas DS6800

UniveralSoft VTA with ESCON connection

BEX replaced by Unitrends Appliance to Disk to Disk to Disk

**2015**

IFLs added

Begin re-hosting Oracle Environment from x86 Redhat to z SUSE

POC Virtual Desktops



**2016**

IBM V7000 acquired to replace all District storage (2<sup>nd</sup> V7000 for replication)

Rocket Software LegaSuite (Web/GUI frontend for 3270)

Untrends upgraded from Disk to Disk to Disk; now Disk to Disk to Cloud

Begin deploying Virtual Desktops

**2017**

Disconnect UniversalSoft VTA, begin using IBM VTAPE/VTAPEJCL.REXX

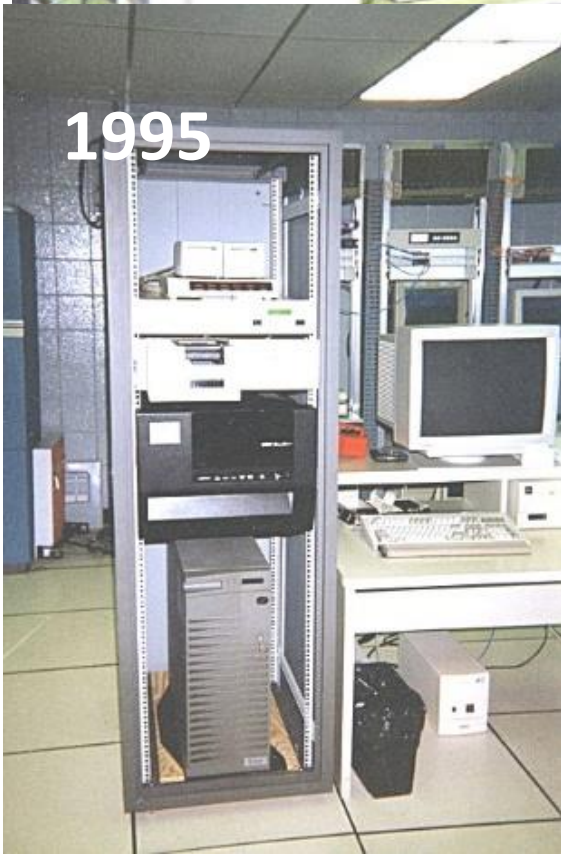
IBM z13s B01, running zVM, SUSE, zVSE, CICS, Adabas, Natural, VSAM, Oracle

**2018**

Rocket LegaSuite into Production, restrict access to traditional 3270 environment



1993



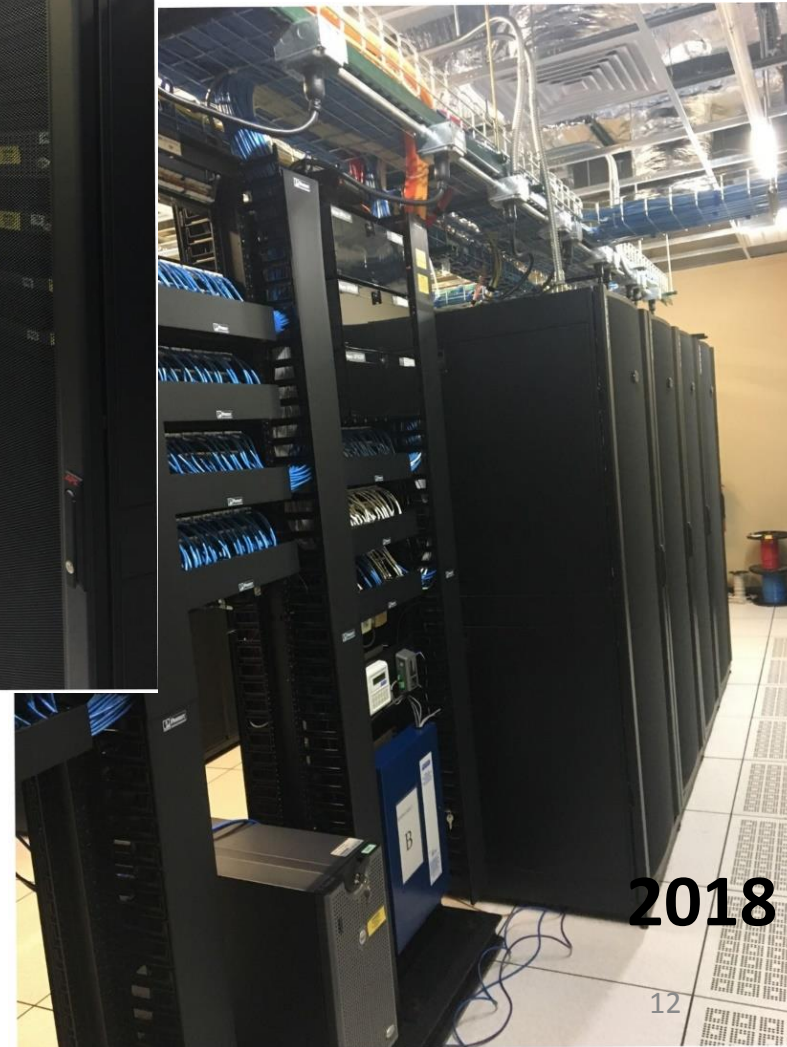
1995



1999



2018



2018



# ITS Philosophy

- Utility
- Heterogeneous approach to Homogeneous Systems
  - **“A Computer is a computer is a computer”**
- Anyone can log in anywhere and do their job
- Support a Variety of Operating Systems
  - Windows 7 & 10, Server 2003, 2008, 2012, 2016
  - Linux (SUSE, Centos, others)
  - VMWare
  - z/VM, z/VSE
  - Novell Netware
  - Novell OES
- Hosted and Cloud (Whatever makes sense!)
- Virtualize Everything!
- IP Everything (Desktops, Phones, Cameras, Gates, Burglar Alarms, Doors, Radios), if it is low voltage, use CAT6 now
- Build Systems/Build Tools, don't do user's jobs for them
- Good ideas, go ahead and steal!
- Redundancy in daily operations



# ITS Overview

- **RRWRD Streams (Sewage TREATment Management System)**
  - zVSE, Software/AG Natural and Adabas
    - Customer Billing & Collection, Permitting, Sample Scheduling, Tracking, EPA Reporting, etc. Streams receives data from a variety of sources. It integrates with a variety of other systems.
- **Infor Public Sector (Asset and Work Order Management)**
  - Browser Based (IIS), Oracle DB (under Linux on Z)
- **CUES, Inc. GraniteNet Sewer Inspection Management System**
  - Windows based app, Oracle DB (under Linux on Z)
- **ESRI ArcGIS Geographic Information System (GIS)**
  - Windows based app, Oracle DB (under Linux on Z) and SQL Server under Windows (at consortium)
- **BlackBaud Financial Edge (G/L, A/P, Payroll, etc.)**
  - Browser Based Cloud Hosted SQL\_Server, Citrix Terminal Services application



# ITS Overview

- Process Control System/SCADA (ITS supplied infrastructure)
  - SQL\_Server, web based client application
- Linko (Fats, Oils and Grease) Food Service and Inspection
  - Cloud base
  - Browser Based Hosted application
- Security and Access control
  - Windows applications & Linux Appliances
- Security Cameras
  - Windows and Linux Appliances



# ITS Overview

- Traditional (Word, Excel, Email, AutoCAD, TimeKeeping)  
Email moving from hosted Groupwise to Exchange in the Cloud
- Telephones call recording, cell phones, tablets, laptops, wifi, wifi in vehicles, etc.



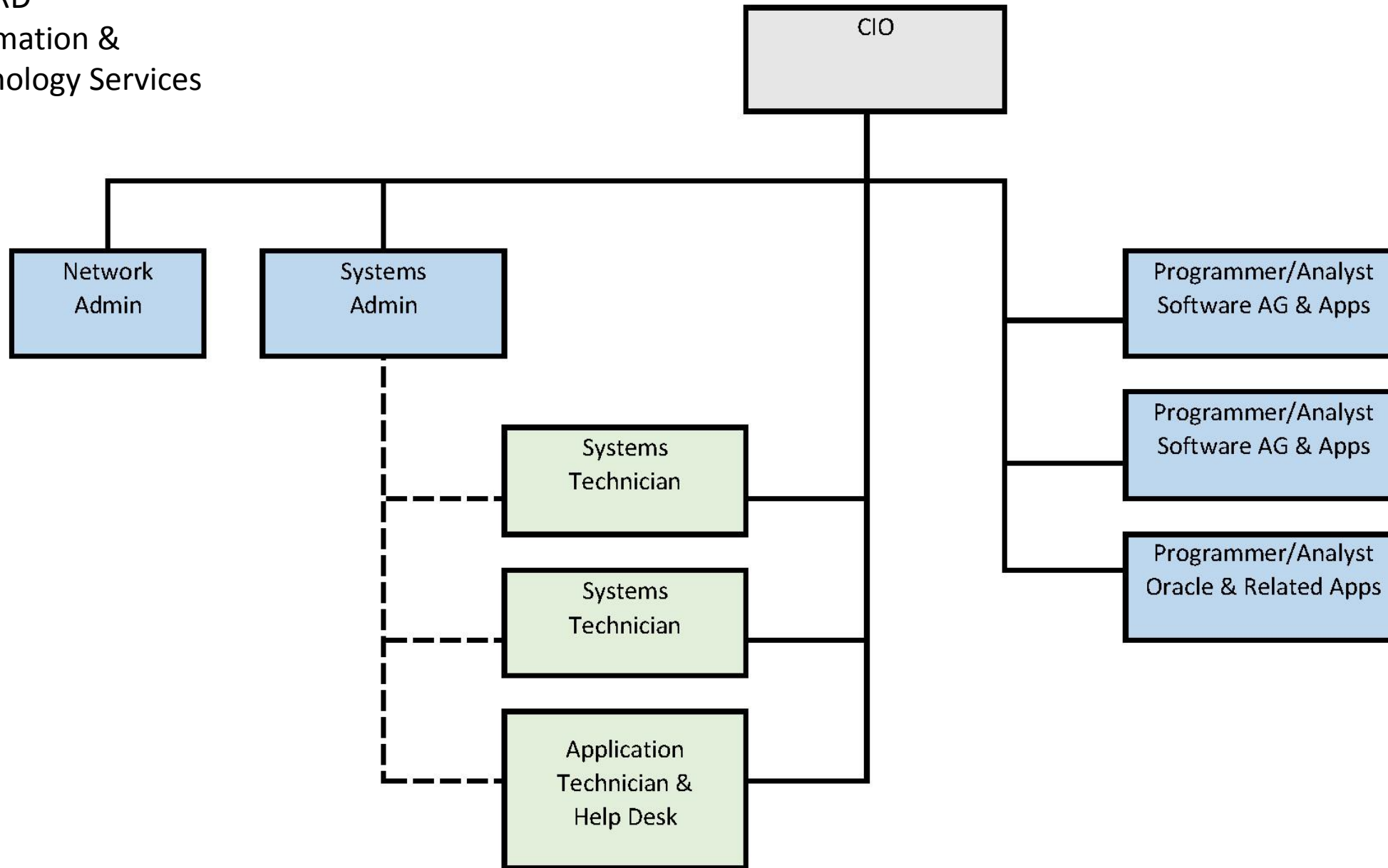


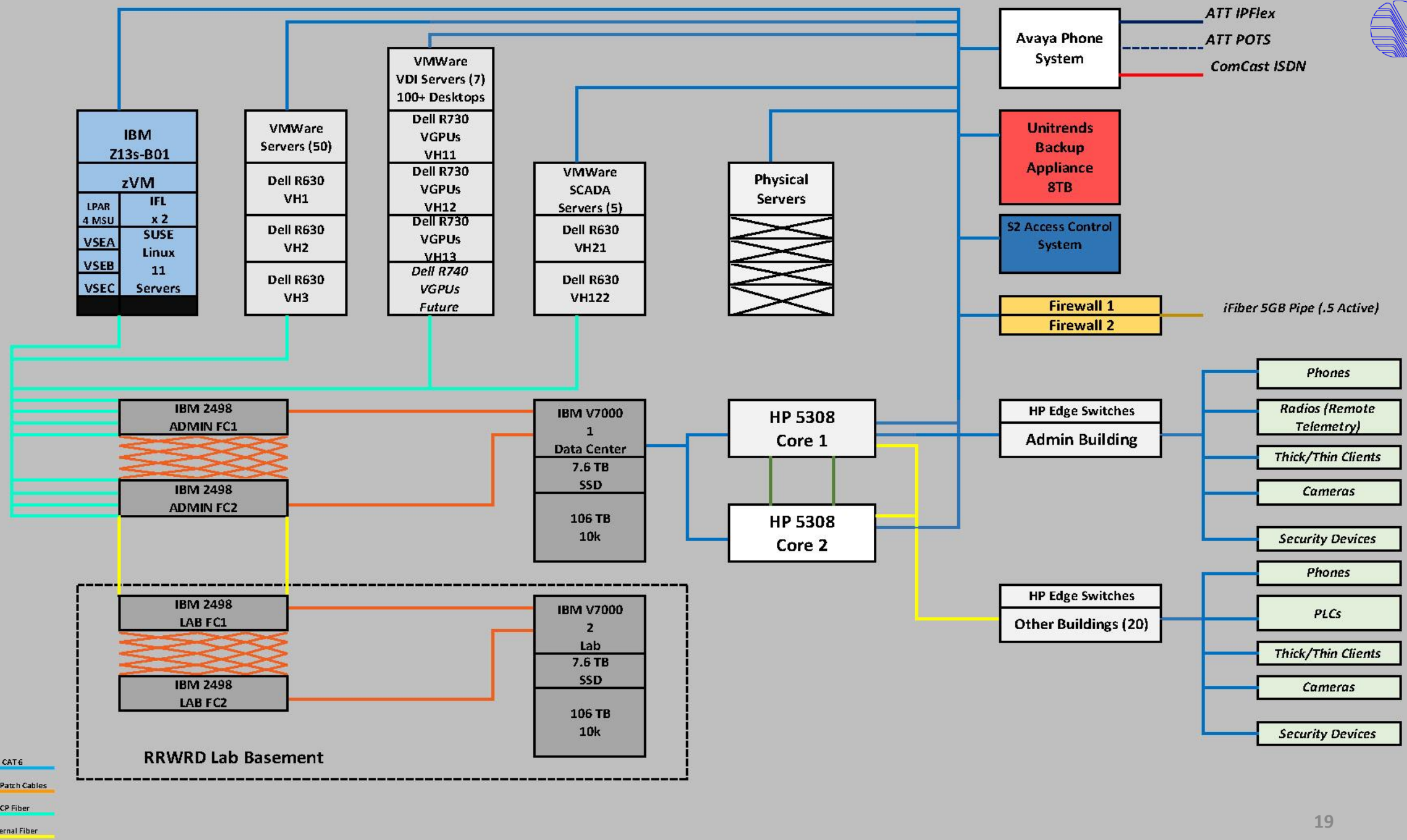
# ITS Overview

- Numbers
  - 106TB Storage (x 2)
  - 8+ miles of fiber optic cabling
  - 50+ miles of Cat 6
  - 50+ VMWare Servers
  - 100+ VMWare Virtual Desktops
  - 100 Virtual Desktop Applications
  - 40 Switches (10 Buildings)
  - 80 Smart Phones
  - 20 in Vehicle Wifi
  - 60+ Security Cameras
  - 2 Sewer TV Vehicles



RRWRD  
Information &  
Technology Services







# IBM z13s-B01

zVM 6.4															
4 MSU/32 Mips			2 IFLS												
VSEA zVSE 6.1	VSEB zVSE 6.1	VSEC zVSE 6.1	L N X M A I N T	L N X L O G	L N X T E R M	R R W R D Z V 1	R R W R D Z V 2	R R W R D Z V 3	R R W R D Z V 4	R R W R D Z V 5	R R W R D Z V 6	R R W R D Z V 7	R R W R D Z V 8	R R W R D Z V 9	R R W R D Z V A
			SLES 11	SLES 11	SLES 11	SLES 12	SLES 11	SLES 11	SLES 11	SLES 11	SLES 11	SLES 11	SLES 12	SLES 11	SLES 11
							ORACLE	ORACLE	ORACLE	ORACLE	ORACLE		ORACLE		ORACLE
PROD	TEST	Sandbox				PROD	PROD	PROD	TEST	PROD	TEST	VTAPE	TEST	TEST	PACP TEST



Z/VSE 6.1														
PROD														
F1	F2	F3	BG	F4	F5	F6	F7	F8	F9	FA	FB	Dynamic	Partitions	
Power	CICSICCF	VTAM	Batch	Batch	Batch	Batch	Batch	Batch	Batch	Batch	Batch	Security Server	O1	TapeServer
													N1	CSI TCPIP (TN3270)
													N2	BSI IPV4
													P1	Production CICS
													S1	Adabas (Natural)
													D1	Adabas (Production)
													M1	MacKinney VVP
													V1-V8	Thigpen VSE2PDF
													Q1	Test CICS
													U1	Adabas (TEST)
													R1	CSI TCPIP (FTP)
													C	Batch (LIBR, Assembler, etc.)
													Y1-Y8	Batch



# RRWRD – zVSE – STREAMS

- Streams is the primary application running under zVSE.
- Bills Customers, Issues Permits, Schedules and Track Samples, Calculate Rates, Issue Liens
- Generates EPA reports
- Receives consumption data from the internet (7 Municipalities), RRWRD handheld and drive by meter reading
- Written entirely in Natural and Adabas, uses a little VSAM (all VSAM/SAM)
- Some Rexx to manage input data (update \* \$\$ SLI, FTP Socket Programming)
- Processes Lockbox payments
- Processes ebill payments (30% of all payments)
- Generates 500,000 documents a year (most are printed or e billed after transmitted to vendor)
- 1,000 zVSE jobs (95%+ are automatic or user submitted)
- 4,400 program objects (Natural, Rocket LegaSuite, Rexx)
- PDF Output for receipts, duplicates, special bills to users
- All reports are pdf to email
- 54,000,000 Records



# Rock River Water Reclamation District

- Billing
- Engineering
- Plant Operations**
- Lab
- Others
- Tools
- Log Off

## PO Maintenance

- Categorical Standards
- Industrial Billing Calendar
- Pollutant Charges
- Discharge Master
- Lift Station Master
- Non Routine Master
- FSE Permit Master
- Local Limits
- Pollutants

## PO Table Maintenance

- Bottles Codes
- Pollutant Types
- Septic Hauler Action Level
- Lift Station Failure Codes
- Qualifiers and Labs
- Treatment Plant Comments
- Method Codes
- Preservative Codes
- Treatment Plant Permits
- NCPS Codes
- Reason Codes
- Type Sample
- Physical Appearance
- Sampler Techs

## Sample Maintenance

- Actual Samples
- Industrial Sample Organics
- Organic Samples
- Chain of Custody
- Non Routine Organic
- Outstanding Samples
- Industrial Sample Metals
- Non Routine Sample

## Sampling

- Actual Sample History
- Display Sample Schedules
- Req Sample Schedules
- BOD, COD, TSS Results
- Sample Date Required
- Total WWC
- Companies w/o Sched Dates
- Select Pollutant Results

## Chemistry Industrial

- Actual Sample Maint
- Non Routine Organic
- Receive NR Lab Samples
- Analytical Report - EPA
- Non Routine Sample
- Sample Sheet Data
- Detail Lab Analysis
- Organic Samples
- Validate Lab Analysis
- Non Routine Master
- Receive Lab Samples

## Chemistry Plant

- Daily Digester Data
- Validate by Parameter
- Validate Stormwater Data
- Daily Treatment Process
- Validate CC, CC STR, US
- Validate Tributary Data
- Plant Custody
- Validate Final, Primary, Raw
- Validate Tributary Metal Data
- Receive River Samples
- Validate River Data
- Validate Winnebago Data
- Validate Anions Data
- Validate River Metal Data

## Treatment Processing

- Calculations
- Factors
- Validate by Parameter
- Data Input
- Land App Master
- Validate Data Input
- Download Annual Report Data
- Lock Files
- Variables
- Download Monthly Report Data
- Mathematics

## Miscellaneous

- Release a Lab Upload
- Pollutant Maintenance
- Customer Discharge



# Customer Account Inquiry

CA0010M1  
MKD3  
VSEA/PROD



- 
- 
- 
- 
- 
- 
- 
- 
- Maintenance
- Additional
- Query
- Stub
- Adjustments
- Last Accts

More

- Account
- Consumption
- Bills
- Transactions
- Cons History
- Collections
- ERU
- Clear Water

Process Payment

Domestic Account  Municipal Account

Assessor  WinGis  View  Rrwr WinGis

### Owner Information

Mr. John Doe  Home Phone

Cell Phone

123 Main St

Rockford  IL  61109

Comments

### Property Information

123 Main St

Rockford  IL  61109

Property Number

Old Property Number

### Account Information

Billing Group	<input type="text" value="4"/>	Stage	<input type="text"/>	Billable account	<input type="text"/>	Print Rule	<input type="text" value="Normal"/>
Customer Type	<input type="text" value="Domestic"/>	Bill Method	<input type="text" value="Paper Bill"/>			Print Rule Override	<input type="text"/>
Land Use	<input type="text" value="One (1) Family"/>	Average Consumption	<input type="text" value="22"/>			Sample Point	<input type="text"/>
Land Use Code	<input type="text" value="R001"/>	Number of Quarters for Avg	<input type="text" value="8"/>			PO Permit	<input type="text"/>
NAICS	<input type="text" value="RRRRRR"/>	Quarter Average	<input type="text" value="78.56"/>			Header Account	
Account Status	<input type="text" value="Active"/>	Number of Bills Issued	<input type="text" value="68"/>			<input type="button" value="Generate Final Bill"/>	
Last Bill Date	<input type="text" value="04/27/2018"/>	Winter Daily Average	<input type="text" value=".2631"/>			<input type="button" value="Generate Regular Bill"/>	
Penalty Date	<input type="text"/>	Winter Daily Average + 20%	<input type="text" value=".3157"/>				

### Billing Information

BOD	<input type="text" value="200"/>	Flow Measured In	<input type="text" value="Gallons"/>	Sample Charge	<input type="text" value="0.00"/>
TSS	<input type="text" value="250"/>	Number of Toxics	<input type="text" value="0"/>	IP Charge	<input type="text" value="0.00"/>
NH4	<input type="text" value="12"/>	Percent of Returned Water	<input type="text" value=".00"/>	Organic Charge	<input type="text" value="0.00"/>
				Atypical Charge	<input type="text" value="0.00"/>
				ERU Charge	<input type="text" value="0.00"/>

### Collections

Status  Collection Stage  Date  Collection Balance  Total Balance Due







# History of RRWRD Tape Managers

1985-1994 - Sue

1994-2011 - Karen

2011–2016 –VTA   
w/CASPER

2016+ - VTAPEJCL, VTAPE

*“Our Tape Needs are modest, Backup & Restore databases, system files and disk volumes, daily, weekly, monthly, annually.”*



## VTA (Virtual Tape Appliance)

Windows 2003 (PC on our Network)

Barr Bus & Tag card (ESCON w/z114)  
VTA Software  
iSCSI Attached to Dell EqualLogic SAN

VSE

CASPER – Console Automation Program under zVSE

```
// PAUSE HEY CASPER MOUNT V=SCRATC , CUU=690 , P=D
```

```
// PAUSE HEY CASPER MOUNT L='VSAMBACKUP' , CUU=690 , P=D , G=5
```



### PROS:

Created AWS Format Tapes

Keep Track of Tape Generations

Tape Pools

W=Weekly/D=Daily, etc.

Incremented & Keeps Track Volume IDs

Tapes Retrievable by Label, Volume and Generation

Automatically Delete Volumes after user specified time periods

Inexpensive



CONS:

Casper Managed Tapes, not Tape Drives (Backups, Restores had to have time gaps)

Real zVM Devices

Not easy to separate tapes by Virtual Machine

Only 1 Virtual Machine at a time

No Support for FICON



# Our Choices:

- Real Tape Library
- FICON to ESCON Converter
- Commercial Virtual Tape Appliance
- Build our own using proven IBM technology



## VTAPEJCL.REXX

### GOALS:

- Create AWS Format Tapes
- Keep Track of Tape Generations  
Tape Pools  
W=Weekly/D=Daily, etc.
- Generate & Keep of Track Volume IDs
- Tapes Retrievable by Label, Volume and Generation
- Automatically Delete Volumes after user specified time periods
- Use Off the Shelf Technology
- Fast





## VTAPEJCL.REXX

### GOALS:

- Support multiple virtual machines
- Easily Exchange Tapes between multiple Virtual Machines
- No Assembler Language
- Manage Tape Drives





## VTAPEJCL.REXX How it works!

1. Reads control cards
2. Reads default information
3. Finds/create file names
4. Finds available tape drives
5. Updates Tape Catalogs
6. Generates PARMs to include in VTAPE and // ASSGN statements and catalogs them into a Library member that is then selected with a Source Library Include (SLI) Card





## VTAPEJCL.REXX Consists of 6 Components

1. VTAPEJCL.INI                      Default Location Information, available Tape Drives to use, etc. (IJSYSRS.SYSLIB)
2. VTAPEJCL.REXX                    Main Program, updates catalogs (aka Pools), selects Tape Drives, generates PARMS for // VTAPE and // ASSGN JCL
3. Tape Catalogs (aka Pools) Stores in a zVSE Library (e.g. VTAPEA.VTAPE.D.POOL)
4. Generated JCL                      Stored in a zVSE Library (e.g. BAKVSAM.JCL, use \* \$\$ SLI to bring into Job)
5. Disk Storage                        Store Tapes (ours is a 2TB Volume on V7000)
6. IBM VTAPE Server                  Running somewhere (ours is SUSE SLES 12 on IFL, accessed with Hipersocket)



## VTAPEJCL.INI

<b>VTAPE SERVER IP=xxx.xxx.xxx.xxx</b>	(IP Address of VTAPE Server)
<b>VTAPE HOME= /xxxxx/</b>	(Disk Location for Tape Storage)
<b>VTAPE POOL LIB=xxxxxxxxx.xxxx</b>	(Location of Tape Pool Catalogs)
<b>VTAPE SLI LIB=xxxxxxxxx.xxxx</b>	(Location to Generate JCL)
<b>VTAPE TAPE=cuu</b>	(Available to use Tape)



## VTAPEJCL.INI - Example VSEA

```
VTAPEJCL.INI (VTAPEJCL REXX PROGRAM SETTINGS)
05/23/2018 - MLR
VTAPE SERVER IP=192.168.1.11
VTAPE HOME=/VTAPE/AV61
VTAPE POOL LIB=VTAPEA.VTAPE
VTAPE SLI LIB=VTAPEA.VTAPE
VTAPE TAPE=590
VTAPE TAPE=591
VTAPE XXXX=592      * SKIP 592 IT IS USED BY ZVSE
VTAPE TAPE=593
VTAPE TAPE=594
VTAPE TAPE=595
VTAPE TAPE=596
VTAPE TAPE=597
VTAPE TAPE=598
VTAPE TAPE=599
VTAPE TAPE=59A
VTAPE TAPE=59B
VTAPE TAPE=59C
VTAPE TAPE=59D
FREE
FREE
FREE
```



## VTAPEJCL.INI - Example VSEB

```
VTAPEJCL.INI (VTAPEJCL REXX PROGRAM SETTINGS)
05/23/2018 - MLR
VTAPE SERVER IP=192.168.1.11
VTAPE HOME=/VTAPE/BV61
VTAPE POOL LIB=VTAPEB.VTAPE
VTAPE SLI LIB=VTAPEB.VTAPE
VTAPE TAPE=590
VTAPE TAPE=591
VTAPE XXXX=592      * SKIP 592 IT IS USED BY ZVSE
VTAPE TAPE=593
VTAPE TAPE=594
VTAPE TAPE=595
VTAPE TAPE=596
VTAPE TAPE=597
VTAPE TAPE=598
VTAPE TAPE=599
VTAPE TAPE=59A
VTAPE TAPE=59B
VTAPE TAPE=59C
VTAPE TAPE=59D
FREE
FREE
FREE
```



## VTAPEJCL.REXX – Input Cards

**// EXEC REXX=VTAPEJCL,PARM='XXXXXXXX'**

PARM=name of JCL SLI

**TYPE=NEW/OLD**

Read Existing Tape versus Create a New Tape

**L=Tape Label/Name**

Name of File (Required with **TYPE=NEW**)

**V=Volume**

Can be used to retrieve specific volume with **TYPE=OLD**

**G=Generation**

Select a specific generation of a tape, use with

**TYPE=OLD, L=** Default = 0 (current generation)

**P=Pool**

Select a Pool (e.g. D=Daily, W=Weekly, etc.)

**DEVICE=YES/NO**

Assign Tape Drive(s)

**TAPES=NONE/1/n**

How many Tapes to assign (Useful with Software/AG Adabas Backups) Note None=1

**DEBUG=YES/NO**

Verbose listing



## VTAPEJCL.REXX – Input Cards

**INI VTAPE HOME=**

Overrides **VTAPEJCL.INI HOME=**

**INI VTAPE POOL LIB=**

Overrides **VTAPEJCL.INI POOL LIB=**

**INI VTAPE SLI LIB=**

Overrides **VTAPEJCL.INI SLI LIB=**



## VTAPEJCL.REXX - Tape Catalogs

### VTAPEA.VTAPE:D.POOL

```
POOL=/DT/  
VOLUME=D01680, LABEL=PRODADABAS, DATE=06042018, TIME=18350221, TAPES=2  
VOLUME=D01679, LABEL=NATLADABAS, DATE=06042018, TIME=18320291, TAPES=2  
VOLUME=D01678, LABEL=VSAMBACKUP, DATE=06042018, TIME=18150175, TAPES=NONE  
VOLUME=D01677, LABEL=RRWRDPACCT, DATE=06042018, TIME=17150250, TAPES=NONE  
VOLUME=D01676, LABEL=PRODADABAS, DATE=06032018, TIME=18350351, TAPES=2  
VOLUME=D01675, LABEL=NATLADABAS, DATE=06032018, TIME=18320287, TAPES=2  
VOLUME=D01674, LABEL=VSAMBACKUP, DATE=06032018, TIME=18150167, TAPES=NONE  
VOLUME=D01673, LABEL=RRWRDPACCT, DATE=06032018, TIME=17150220, TAPES=NONE  
VOLUME=D01672, LABEL=VSAMBACKUP, DATE=06022018, TIME=19234908, TAPES=NONE
```





## VTAPEJCL.REXX – Tape Storage

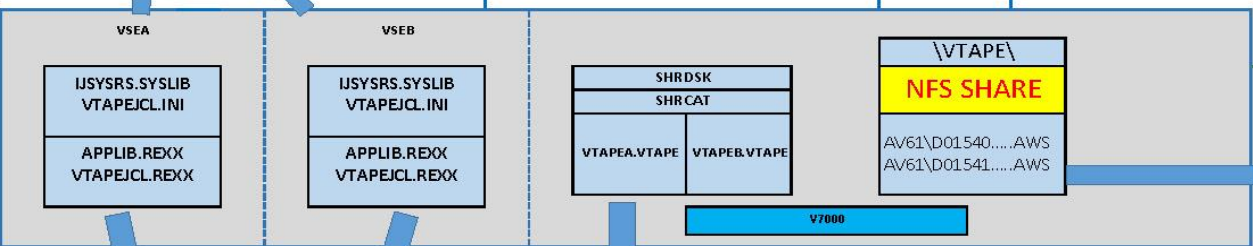
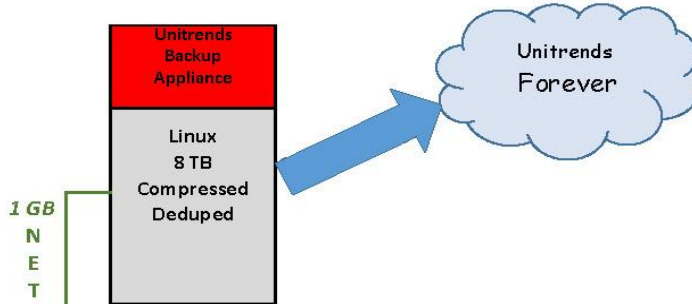
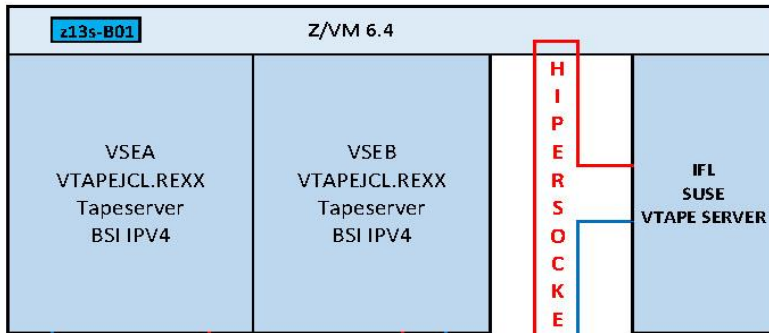
### Remote files

🏠 🔍 📁 🗑️ 📄 🏠 /VTAPE/AV61/DT

Name	Size	Type	Date Modified	Attributes	Exten...
D01680.PRODADABAS.06042018.18350221.NO2.AWS	5,074,339,457	AWS File	6/4/2018 6:48 PM	-rw-r--	AWS
D01680.PRODADABAS.06042018.18350221.NO1.AWS	4,296,573,609	AWS File	6/4/2018 6:48 PM	-rw-r--	AWS
D01679.NATLADABAS.06042018.18320291.NO2.AWS	652,173,787	AWS File	6/4/2018 6:33 PM	-rw-r--	AWS
D01679.NATLADABAS.06042018.18320291.NO1.AWS	61,882,746	AWS File	6/4/2018 6:33 PM	-rw-r--	AWS
D01678.VSAMBACKUP.06042018.18150175.AWS	2,203,926	AWS File	6/4/2018 6:15 PM	-rw-r--	AWS
D01677.RRWRDPACCT.06042018.17150250.AWS	268,898	AWS File	6/4/2018 5:15 PM	-rw-r--	AWS
D01676.PRODADABAS.06032018.18350351.NO1.AWS	4,296,109,745	AWS File	6/3/2018 6:48 PM	-rw-r--	AWS
D01676.PRODADABAS.06032018.18350351.NO2.AWS	5,072,990,347	AWS File	6/3/2018 6:48 PM	-rw-r--	AWS
D01675.NATLADABAS.06032018.18320287.NO2.AWS	652,168,871	AWS File	6/3/2018 6:33 PM	-rw-r--	AWS
D01675.NATLADABAS.06032018.18320287.NO1.AWS	61,880,851	AWS File	6/3/2018 6:33 PM	-rw-r--	AWS
D01674.VSAMBACKUP.06032018.18150167.AWS	2,168,660	AWS File	6/3/2018 6:15 PM	-rw-r--	AWS
D01673.RRWRDPACCT.06032018.17150220.AWS	151,762	AWS File	6/3/2018 5:15 PM	-rw-r--	AWS
D01672.VSAMBACKUP.06022018.19234908.AWS	2,168,660	AWS File	6/2/2018 7:23 PM	-rw-r--	AWS
D01669.RRWRDPACCT.06022018.17150239.AWS	130,882	AWS File	6/2/2018 5:15 PM	-rw-r--	AWS



```
VTAPEJCL.INI (VTAPEJCL REXX PROGRAM SETTINGS)
05/23/2018 - MLR
VTAPE SERVER IP=192.168.1.11
VTAPE HOME=/VTAPE/AV61
VTAPE POOL LIB=VTAPEA.VTAPE
VTAPE SLI LIB=VTAPEA.VTAPE
VTAPE TAPES=590
VTAPE TAPES=591
VTAPE XXXX=592 * SKIP 592 IT IS USED BY ZVSE
VTAPE TAPES=593 /VTAPE/AV61
VTAPE TAPES=594
VTAPE TAPES=595
VTAPE TAPES=596
VTAPE TAPES=597
VTAPE TAPES=598
VTAPE TAPES=599
VTAPE TAPES=59A
VTAPE TAPES=59B
VTAPE TAPES=59C
VTAPE TAPES=59D
FREE
PRRR
FREE
FREE
FREE
PRDE
PRRR
```



```
REXX/VSE PROGRAM
PROGRAM NAME: VTAPEJCL (VTAPE INTERFACE PROGRAM)
NARRATIVE :
-----
| DATE | WHO | CHANGE |
-----
| 01/23/2017 | MLR | NEW PROGRAM - PRODUCTION |
| 05/18/2018 | MLR | FIXED OVERRIDE POOL= |
| 05/23/2018 | MLR | ADDED SLI LIB & OVERRIDE |
-----
Creates parms for VTAPE and associated JC
-----
TYPE=NEW,TAPES=1,L='PRODADAB',POOL=D,DRIVE
TYPE=NEW,TAPES=NONE,L='PRODADAB',POOL=D
TYPE=OLD,L='PRODADAB',POOL=D,G=0
TYPE=OLD,V=D00010,POOL=D,G=0
```

MEMBER=D.POOL    SUBLIBRARY=VTAPEA.VTAPE    DATE: 2018-05-30    TIME: 15:14

```
POOL=/DT/
VOLUME=D01656,LABEL=PRODADABAS,DATE=05292018,TIME=19541420,TAPES=2
VOLUME=D01655,LABEL=PRODADABAS,DATE=05292018,TIME=18370250,TAPES=2
VOLUME=D01654,LABEL=NATLADABAS,DATE=05292018,TIME=18320421,TAPES=2
VOLUME=D01653,LABEL=VSAMBACKUP,DATE=05292018,TIME=18150214,TAPES=NONE
VOLUME=D01652,LABEL=RRWRDPACCT,DATE=05292018,TIME=17150182,TAPES=NONE
VOLUME=D01651,LABEL=PRODADABAS,DATE=05282018,TIME=18370190,TAPES=2
VOLUME=D01650,LABEL=NATLADABAS,DATE=05282018,TIME=18320265,TAPES=2
VOLUME=D01649,LABEL=VSAMBACKUP,DATE=05282018,TIME=18150210,TAPES=NONE
VOLUME=D01648,LABEL=RRWRDPACCT,DATE=05282018,TIME=17150230,TAPES=NONE
VOLUME=D01647,LABEL=PRODADABAS,DATE=05272018,TIME=18370279,TAPES=2
VOLUME=D01646,LABEL=PRODADABAS,DATE=05272018,TIME=18320335,TAPES=2
VOLUME=D01645,LABEL=RRWRDPACCT,DATE=05272018,TIME=18150263,TAPES=NONE
VOLUME=D01644,LABEL=RRWRDPACCT,DATE=05272018,TIME=17150245,TAPES=NONE
```

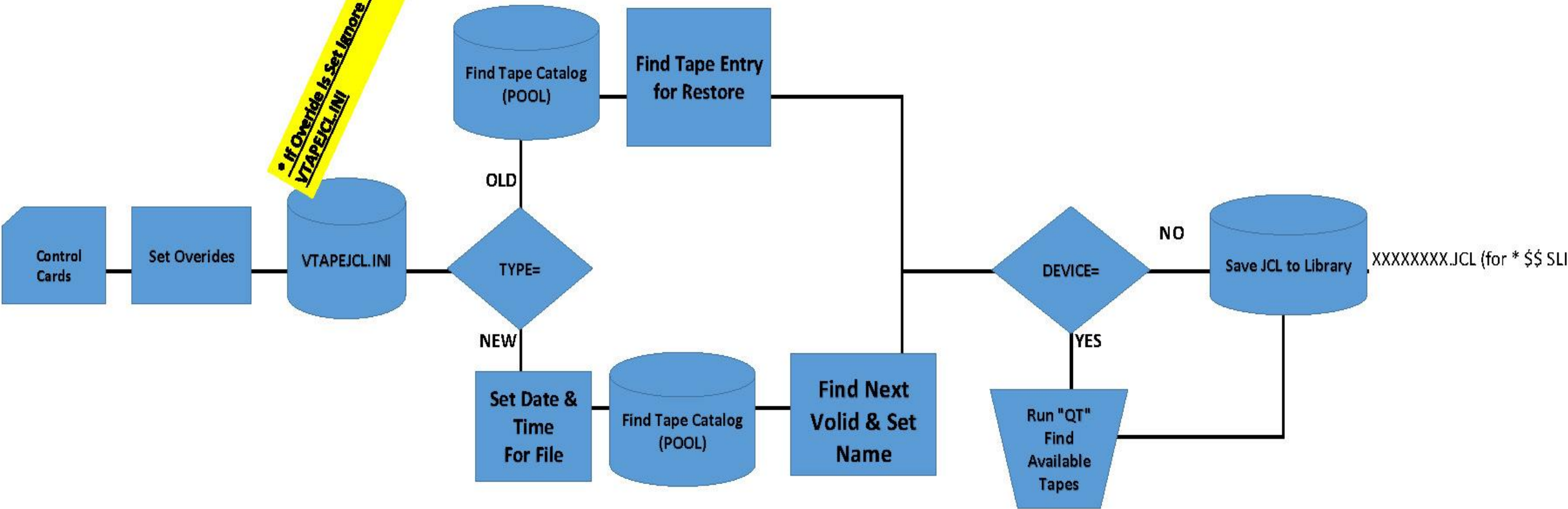
1 GB NETWORK

File Name	Size	Type	Date Modified	Attributes
D01539.RRWRDPACCT.05012018.17150229.AWS	352,781	AWS File	5/1/2018 5:15 PM	rw-r--r--
D01540.VSAMBACKUP.05012018.18150066.AWS	2,006,082	AWS File	5/1/2018 6:15 PM	rw-r--r--
D01541.RRWRDPACCT.05022018.17150231.AWS	337,577	AWS File	5/2/2018 5:15 PM	rw-r--r--
D01542.VSAMBACKUP.05022018.18150223.AWS	1,218,214	AWS File	5/2/2018 6:15 PM	rw-r--r--
D01543.NATLADABAS.05022018.18320367.NO1.AWS	62,600,058	AWS File	5/2/2018 6:33 PM	rw-r--r--
D01543.NATLADABAS.05022018.18320367.NO2.AWS	651,119,930	AWS File	5/2/2018 6:33 PM	rw-r--r--
D01544.PRODADABAS.05022018.18370313.NO1.AWS	4,273,061,782	AWS File	5/2/2018 6:50 PM	rw-r--r--
D01544.PRODADABAS.05022018.18370313.NO2.AWS	5,039,370,892	AWS File	5/2/2018 6:50 PM	rw-r--r--
D01545.ADALDNAT.05032018.09591790.NO1.AWS	66,267,344	AWS File	5/3/2018 9:59 AM	rw-r--r--
D01546.RRWRDPACCT.05032018.17150243.AWS	265,306	AWS File	5/3/2018 5:15 PM	rw-r--r--
D01547.VSAMBACKUP.05032018.18150130.AWS	274,302,827	AWS File	5/4/2018 10:45 AM	rw-r--r--
D01548.NATLADABAS.05032018.18320591.NO1.AWS	61,197,882	AWS File	5/3/2018 6:33 PM	rw-r--r--
D01548.NATLADABAS.05032018.18320591.NO2.AWS	650,426,357	AWS File	5/3/2018 6:33 PM	rw-r--r--
01549.PRODADABAS.05032018.18370175.NO1.AWS	4,273,153,825	AWS File	5/3/2018 6:50 PM	rw-r--r--
01549.PRODADABAS.05032018.18370175.NO2.AWS	5,039,210,208	AWS File	5/3/2018 6:50 PM	rw-r--r--
01549.VSAMBACKUP.05042018.10533326.AWS	1,219,506	AWS File	5/4/2018 10:53 AM	rw-r--r--
01549.VSAMBACKUP.05042018.10533326.AWS	1,219,506	AWS File	5/4/2018 11:15 AM	rw-r--r--
01549.VSAMBACKUP.05042018.10533326.AWS	347,113	AWS File	5/4/2018 5:15 PM	rw-r--r--
01549.VSAMBACKUP.05042018.10533326.AWS	1,219,506	AWS File	5/4/2018 6:15 PM	rw-r--r--



# VTAPEJCL.REXX – How it works

**• If Override is Set Ignore Value In VTAPEJCL.INI**





VTAPEJCL.REXX – Example 1



# Nightly VSAM Backup



## VTAPEJCL.REXX – Example 1 Nightly VSAM Backup

```
* $$ JOB JNM=BAKVSAM, DISP=L, CLASS=Y, PRI=3, LDEST=*
* $$ LST CLASS=A, LST=00E, DEST=(, EMAIL), X
* $$ MAILTO=(SYSOP), X
* $$ TITLE=(&HOSTNAME &JNAME), FILENAME=(, &JNAME.PDF), X
* $$ PAGEDDEF=LAND, FORMDEF=GREBAR
// JOB BAKVSAM BACKUP VSAM DATASETS DAILY - VTAPE
*
* 05/18/2018 - MLR
*
// SETPARM JOB, VSEI='VSEA'
// SETPARM JOB, ADACHK='NO'
* $$ SLI MEM=ABEND1.JCL, S=APPLIB.REXX
/. STEP1
*
* STEP1 - MOUNT TAPE
*
/* SET LOCAL PARAMETERS FOR TAPE
// LIBDEF PROC, SEARCH=APPLIB.REXX
// EXEC REXX=VTAPEJCL, PARM='BAKVSAM'
TYPE=NEW, L='VSAMBACKUP', P=D
/*
```



## VTAPEJCL.REXX – Example 1 Nightly VSAM Backup

### VTAPEA.VTAPE:BAKVSAM.JCL

```
// SETPARM PWRJOB,TAPE1='590'  
// SETPARM PWRJOB,LOC='192.168.1.11'  
// SETPARM PWRJOB,MODE1='SCRATCH'  
// SETPARM PWRJOB,FDR1='/VTAPE/AV61/DT/'  
// SETPARM PWRJOB,FVL1='D01678.'  
// SETPARM PWRJOB,FLB1='VSAMBACKUP.'  
// SETPARM PWRJOB,FDT1='06042018.'  
// SETPARM PWRJOB,FTM1='18150'  
// SETPARM PWRJOB,FEXT1='AWS'
```



## VTAPEJCL.REXX – Example 1 Nightly VSAM Backup

```
/*
* $$ SLI MEM=BAKVSAM.JCL,S=VTAPEA.VTAPE
/* START VTAPE1
// VTAPE START,UNIT=&TAPE1.,LOC=&LOC,                                X
                        FILE='&FDR1.&FVL1.&FLB1.&FDT1.&FTM1.&FEXT1.',&MODE1,    X
                        SCOPE=JOB
/* INITIALIZE TAPE1
// ASSGN SYS000,&TAPE1
// EXEC INTTP
// INTT REWIND,SERIAL=(111111),CODE=(RRWRD      )
*
* STEP2 - BACKUP
*
/. STEP2
// ASSGN SYS005,&TAPE1
// TLBL VSMBKUP,'VSAMBACKUP'
* $$ SLI ICCF=(VSAMSLIV),LIB=(90)
*
/. STEP5
*
STEP5 - RELEASE RESVSAM
*
// PWR R RDR,RESVSAM
$$ SLI MEM=ABEND2.JCL,S=APPLIB.REXX
/&
* $$ EOJ
```

```
VTAPEA.VTAPE:BAKVSAM.JCL
// SETPARM PWRJOB,TAPE1='590'
// SETPARM PWRJOB,LOC='192.168.1.11'
// SETPARM PWRJOB,MODE1='SCRATCH'
// SETPARM PWRJOB,FDR1='/VTAPE/AV61/DT/'
// SETPARM PWRJOB,FVL1='D01678.'
// SETPARM PWRJOB,FLB1='VSAMBACKUP.'
// SETPARM PWRJOB,FDT1='06042018.'
// SETPARM PWRJOB,FTM1='18150'
// SETPARM PWRJOB,FEXT1='AWS'
```



VTAPEJCL.REXX – Example 2



# Restore Nightly VSAM Backup to Test Catalog





## VTAPEJCL.REXX – Example 2 Restore Nightly VSAM Backup to Test Catalog

```
* $$ JOB JNM=RESVSAM, DISP=L, CLASS=Y, PRI=3, LDEST=*
* $$ LST CLASS=A, LST=00E, DEST=(, EMAIL), X
* $$ MAILTO=(SYSOP), X
* $$ TITLE=(&HOSTNAME &JNAME), FILENAME=(, &JNAME.PDF), X
* $$ PAGEDEF=LAND, FORMDEF=GREBAR
// JOB RESVSAM RESTORE VSAM BACKUP DATASETS - VTAPE
*
* 05/18/2018 - MLR
*
/. STEP1
*
* STEP1 - MOUNT TAPE
*
/* SET LOCAL PARAMETERS FOR TAPE
// LIBDEF PROC, SEARCH=APPLIB.REXX
// EXEC REXX=VTAPEJCL, PARM='RESVSAM'
TYPE=OLD, L='VSAMBACKUP', P=D, G=0
/*
```



## VTAPEJCL.REXX – Example 2 Restore Nightly VSAM Backup to Test Catalog

### VTAPEA.VTAPE:RESVSAM.JCL

```
// SETPARM PWRJOB,TAPE1='590'  
// SETPARM PWRJOB,LOC='192.168.1.11'  
// SETPARM PWRJOB,MODE1='READ'  
// SETPARM PWRJOB,FDR1='/VTAPE/AV61/DT/'  
// SETPARM PWRJOB,FVL1='D01678.'  
// SETPARM PWRJOB,FLB1='VSAMBACKUP.'  
// SETPARM PWRJOB,FDT1='06042018.'  
// SETPARM PWRJOB,FTM1='18150'  
// SETPARM PWRJOB,FEXT1='AWS'
```



## VTAPEJCL.REXX – Example 2 Restore Nightly VSAM Backup to Test Catalog

```
* $$ SLI MEM=RESVSAM.JCL,S=VTAPEA.VTAPE
/* START VTAPE1
// VTAPE START,UNIT=&TAPE1.,LOC=&LOC,
           FILE=' &FDR1.&FVL1.&FLB1.&FDT1.&FTM1.&FEXT1.',&MODE1,
           SCOPE=JOB
/*
/. STEP2
*
* STEP2 - RESTORE TO TESTCAT
*
// ASSGN SYS004,&TAPE1
// TLBL VSMREST,'VSAMBACKUP'
// UPSI 10000000 <---- FIX BUFFER STORAGE
* $$ SLI ICCF=(VSAMSLIR),LIB=(90)
/*
/&
* $$ EOJ
```

```
           VTAPEA.VTAPE:RESVSAM.JCL
// SETPARM PWRJOB,TAPE1='590'
// SETPARM PWRJOB,LOC='192.168.1.11'
// SETPARM PWRJOB,MODE1='READ'
// SETPARM PWRJOB,FDR1='/VTAPE/AV61/DT/'
// SETPARM PWRJOB,FVL1='D01678.'
// SETPARM PWRJOB,FLB1='VSAMBACKUP.'
// SETPARM PWRJOB,FDT1='06042018.'
// SETPARM PWRJOB,FTM1='18150'
// SETPARM PWRJOB,FEXT1='AWS'
```



VTAPEJCL.REXX – Example 3



# Nightly Production DB Backup



## VTAPEJCL.REXX – Example 3 Nightly Production DB Backup

```
* STEP5 - MAKE TAPE - DAILY POOL
*
// LIBDEF PROC,SEARCH=APPLIB.REXX
// EXEC REXX=VTAPEJCL,PARM='BAKPRODA'
TYPE=NEW,TAPES=2,L='PRODADABAS',P=D
/*
```



## VTAPEJCL.REXX – Example 3 Nightly Production DB Backup

```
/. STEP6
*
STEP6 - MOUNT & INITIALIZE TAPES
*
$$ SLI MEM=BAKPRODA.JCL,S=VTAPEA.VTAPE
/* START VTAPE1
// VTAPE START,UNIT=&TAPE1.,LOC=&LOC,
        FILE=' &FDR1.&FVL1.&FLB1.&FDT1.&FTM1.&FN1.&FEXT1.',
        &MODE1,SCOPE=JOB
/* INITIALIZE TAPE1
// ASSGN SYS000,&TAPE1
// EXEC INTTP
// INTT REWIND,SERIAL=(111111),CODE=(RRWRD      )
/* START VTAPE2
// VTAPE START,UNIT=&TAPE2.,LOC=&LOC,
        FILE=' &FDR2.&FVL2.&FLB2.&FDT2.&FTM2.&FN2.&FEXT2.',
        &MODE1,SCOPE=JOB
/* INITIALIZE TAPE2
// ASSGN SYS000,&TAPE2
// EXEC INTTP
// INTT REWIND,SERIAL=(222222),CODE=(RRWRD      )
/. STEP7
```

```
VTAPEA.VTAPE:BAKPRODA.JCL
// SETPARM PWRJOB,TAPE1='590'
// SETPARM PWRJOB,TAPE2='591'
// SETPARM PWRJOB,LOC='192.168.1.11'
// SETPARM PWRJOB,MODE1='SCRATCH'
// SETPARM PWRJOB,FDR1='/VTAPE/AV61/DT/'
// SETPARM PWRJOB,FVL1='D01680.'
// SETPARM PWRJOB,FLB1='PRODADABAS.'
// SETPARM PWRJOB,FDT1='06042018.'
// SETPARM PWRJOB,FTM1='18350221.'
// SETPARM PWRJOB,FN1='NO1.'
// SETPARM PWRJOB,FEXT1='AWS'
// SETPARM PWRJOB,MODE2='SCRATCH'
// SETPARM PWRJOB,FDR2='/VTAPE/AV61/DT/'
// SETPARM PWRJOB,FVL2='D01680.'
// SETPARM PWRJOB,FLB2='PRODADABAS.'
// SETPARM PWRJOB,FDT2='06042018.'
// SETPARM PWRJOB,FTM2='18350221.'
// SETPARM PWRJOB,FN2='NO2.'
// SETPARM PWRJOB,FEXT2='AWS'
```



## VTAPEJCL.REXX – Example 3 Nightly Production DB Backup

```
*
STEP7 - BACKUP
*
THIS JOB NORMALLY RUNS WITH ADABAS DOWN
SO THAT FILES CAN BE "MOVED" TO THE TESTADAB
*
// ASSGN SYS011, &TAPE1
// ASSGN SYS012, &TAPE2
// TLBL SAVE1, 'PRODADABAS'
// TLBL SAVE2, 'PRODADABAS'
// EXEC PROC=PRODADAB
// EXEC ADARUN, SIZE=ADARUN
ADARUN PROG=ADASAV, DBID=2, DEVICE=1512 ADARUN MODE=SINGLE, ....
/*
ADASAV SAVE BUFNO=4, DRIVES=2
```

```
VTAPEA.VTAPE:BAKPRODA.JCL
// SETPARM PWRJOB, TAPE1='590'
// SETPARM PWRJOB, TAPE2='591'
// SETPARM PWRJOB, LOC='192.168.1.11'
// SETPARM PWRJOB, MODE1='SCRATCH'
// SETPARM PWRJOB, FDR1='/VTAPE/AV61/DT/'
// SETPARM PWRJOB, FVL1='D01680.'
// SETPARM PWRJOB, FLB1='PRODADABAS.'
// SETPARM PWRJOB, FDT1='06042018.'
// SETPARM PWRJOB, FTM1='18350221.'
// SETPARM PWRJOB, FN1='NO1.'
// SETPARM PWRJOB, FEXT1='AWS'
// SETPARM PWRJOB, MODE2='SCRATCH'
// SETPARM PWRJOB, FDR2='/VTAPE/AV61/DT/'
// SETPARM PWRJOB, FVL2='D01680.'
// SETPARM PWRJOB, FLB2='PRODADABAS.'
// SETPARM PWRJOB, FDT2='06042018.'
// SETPARM PWRJOB, FTM2='18350221.'
// SETPARM PWRJOB, FN2='NO2.'
// SETPARM PWRJOB, FEXT2='AWS'
```



## VTAPEJCL.REXX – Example 3 Nightly Production DB Backup

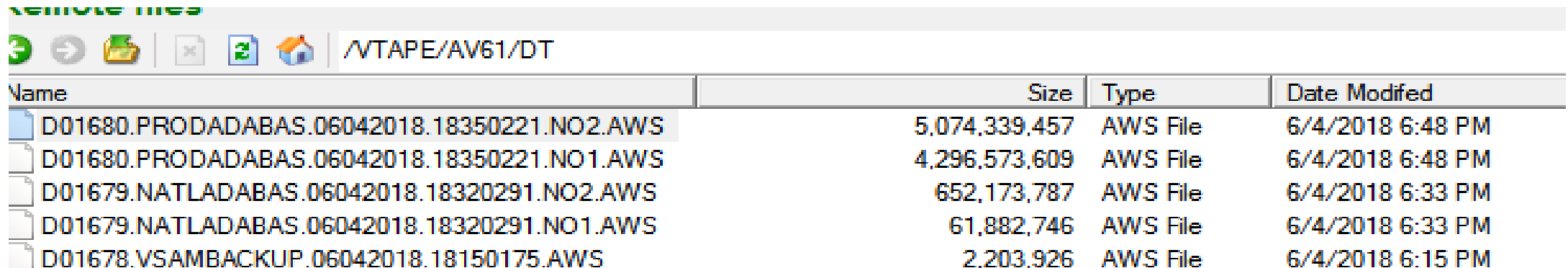
### VTAPEA.VTAPE:D.POOL

POOL=/DT/

VOLUME=D01680, LABEL=PRODADABAS, DATE=06042018, TIME=18350221, TAPES=2

VOLUME=D01679, LABEL=NATLADABAS, DATE=06042018, TIME=18320291, TAPES=2

VOLUME=D01678, LABEL=VSAMBACKUP, DATE=06042018, TIME=18150175, TAPES=NONE



The screenshot shows a file explorer window titled "/VTAPE/AV61/DT". The window displays a list of files with columns for Name, Size, Type, and Date Modified. The files listed are:

Name	Size	Type	Date Modified
D01680.PRODADABAS.06042018.18350221.NO2.AWS	5,074,339,457	AWS File	6/4/2018 6:48 PM
D01680.PRODADABAS.06042018.18350221.NO1.AWS	4,296,573,609	AWS File	6/4/2018 6:48 PM
D01679.NATLADABAS.06042018.18320291.NO2.AWS	652,173,787	AWS File	6/4/2018 6:33 PM
D01679.NATLADABAS.06042018.18320291.NO1.AWS	61,882,746	AWS File	6/4/2018 6:33 PM
D01678.VSAMBACKUP.06042018.18150175.AWS	2,203,926	AWS File	6/4/2018 6:15 PM





VTAPEJCL.REXX – Example 4



# Restore Nightly Production DB (VSEA) Backup on VSEB



## VTAPEJCL.REXX – Example 4 Restore Nightly Production DB Backup (VSEA) on VSEB

```
/. STEP1
RESRSLI
*
* STEP1 - GET TAPE - DAILY POOL
*
// LIBDEF PROC,SEARCH=APPLIB.REXX
// EXEC REXX=VTAPEJCL,PARM='RESPRODB`
INI VTape HOME=/VTape/AV61
INI VTape POOL LIB=VTape.VTape
TYPE=OLD,TAPES=2,L='PRODADABAS',P=D,G=0
/*
```



**VERRIDE CARDS**



## VTAPEJCL.REXX – Example 4 Restore Nightly Production DB Backup (VSEA) on VSEB

```
/. STEP6
*
* STEP6 - MOUNT TAPES
*
$$ SLI MEM=RESPRODB.JCL,S=VTAPEB.VTAPE
/* START VTAPE1
// VTAPE START,UNIT=&TAPE1.,LOC=&LOC,
           FILE=' &FDR1.&FVL1.&FLB1.&FDT1.&FTM1.&FN1.&FEXT1.',
           &MODE1,SCOPE=JOB
/* START VTAPE2
// VTAPE START,UNIT=&TAPE2.,LOC=&LOC,
           &FVL2.&FLB2.&FDT2.&FTM2.&FN2.&FEXT2.',
           &MODE2,SCOPE=JOB
```

```
                VTAPEB.VTAPE:RESPRODB.JCL
// SETPARM PWRJOB,TAPE1='590'
// SETPARM PWRJOB,TAPE2='591'
// SETPARM PWRJOB,LOC='192.168.1.11'
// SETPARM PWRJOB,MODE1='READ'
// SETPARM PWRJOB,FDR1='/VTAPE/AV61/DT/'
// SETPARM PWRJOB,FVL1='D01684.'
// SETPARM PWRJOB,FLB1='PRODADABAS.'
// SETPARM PWRJOB,FDT1='06052018.'
// SETPARM PWRJOB,FTM1='18350382.'
// SETPARM PWRJOB,FN1='NO1.'
// SETPARM PWRJOB,FEXT1='AWS'
// SETPARM PWRJOB,MODE2='READ'
// SETPARM PWRJOB,FDR2='/VTAPE/AV61/DT/'
// SETPARM PWRJOB,FVL2='D01684.'
// SETPARM PWRJOB,FLB2='PRODADABAS.'
// SETPARM PWRJOB,FDT2='06052018.'
// SETPARM PWRJOB,FTM2='18350382.'
// SETPARM PWRJOB,FN2='NO2.'
// SETPARM PWRJOB,FEXT2='AWS'
```



# Questions?



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# Thanks!

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