Metbox Components

- Metbox
  - Hardware and software
    - LDM
      - Data management system
    - GEneral Meteoro logical PAcKage (GEMPAK)
      - A suite of applications and configuration files that decodes, analyzes, and displays meteorological data
    - N-AWIPS
      - NCEP or (NMC) Advanced Weather Information Processing System
      - GUI applications in GEMPAK “N-Progs”
        » NMAP, GARP, NWX, and NSHARP
      - Includes GEMPAK
Unidata Local Data Manager (LDM)

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Topics

- What is LDM?
- Metbox Data Flow
- LDM server
  - Start, Stop, Watch, etc.
- pqact
- Trouble shooting
  - Unix Commands
  - Tree Diagrams
What is LDM?

- Local Data Manager (LDM)
- Developed by Unidata (a subsidiary of UCAR)
- A data management system
  - Focus is on managing meteorological data
    - NWS, WMO, Academia, etc.
    - satellite, radar, model data, profilers, etc.
  - Metbox uses it for retrieving, decoding, and archiving of NOAAPORT data.
Metbox Data Flow
LDM Directory Structure

- /usr/local/ldm
  - bin
  - data
  - decoders
  - etc
  - logs
  - Product Queue
    - /ldmQueue/ldm.pq
  - GEMPAK
    - Data
      - /data/ldm
    - Decoders
      - /usr/local/gempak/bin/linux
  - ldm
    - Configuration files
    - Log files

Soft Linked
LDM Server

- An application that runs in the background
  - Event driven
- Communicates with other LDM Servers to retrieve or send data
- On Metbox writes incoming data to a product queue
- Starts and stops the PQACT server
- The `ldmadmin` application interacts with the LDM server
ldmadmin

- Control the LDM Server
  - Start, Stop, or Restart
- Watch data flow
  - Watch or check logs
- Interacts with the product queue
  - Make, Delete, or Check
- Remove data
  - Scour
- Verifies pqact configuration is correct

metbox>man ldmadmin (detailed help)
metbox>ldmadmin --help (brief help)
ldmd.conf

- LDM Server configuration file
- Located in /usr/local/ldm/etc/ldmd.conf
- Allows, or request data to or from a remote LDM Server
  - Note: NOAAPORT only routes data
- Tells LDM which pqact applications with any options to run
pqact

- A server that—
  1. reads the contents of the product queue
  2. directs the content of queue to—
     - decoders, standard output, database, etc.
- Time driven, e.g., reads the product queue on a time interval
  - Metbox is set to 15 seconds (Default)
- Started and stopped by the ldm server on startup and shutdown
Product Queue

Headers

RADAR
GRIB
Satellite
RedBook Graphics
Text
PQACT Configuration File

- A road map
  - Tells the pqact what to do with the data after it reads the product queue
  - Based pattern on matching in the header
LDM Trouble Shooting
Linux X-term Commands

- uptime
- top
- ps and grep
- df
uptime

- Tells how long the system has been running
- Number of users
- System load 1, 5, and 15 minutes

[ldm@nimbus ldm]$ uptime
23:52:28  up 32 days, 21:11,  3 users,  load average: 0.98, 1.52, 2.05

Note: For a graphical load use "xload"
- Provides continuous CPU activity
- Lists most current CPU intensive processes
- Provides **uptime** output

```
[ldm@nimbus ldm]$ top
01:14:27 up 32 days, 22:33, 3 users, load average: 0.86, 0.85, 1.10
189 processes: 188 sleeping, 1 running, 0 zombie, 0 stopped
CPU states: cpu user nice system irq softirq iowait idle
  total 0.9% 0.0% 2.6% 0.0% 0.0% 35.6% 60.5%
  cpu00 0.9% 0.0% 3.3% 0.0% 0.1% 35.3% 60.0%
  cpu01 0.9% 0.0% 1.9% 0.0% 0.0% 35.9% 61.0%
Mem: 1025192k av, 992252k used, 32940k free, 0k shrd, 268676k buff
          732684k actv, 143208k in_d, 16252k in_c
Swap: 2040212k av, 264776k used, 1775436k free
        472136k cached

PID USER PRI NI SIZE RSS SHARE STAT %CPU %MEM TIME CPU COMMAND
  19181 ldm 15  0 14344 13M 344 S  1.4  1.3  2:49  0 pqact
  3949 4dwx 15  0  432  392 308 S  0.6  0.0 1259m  0 autorun
  19183 ldm 15  0 20152 19M 324 S  0.4  1.9  1:02  1 rpc.ldmd
   10 root 15  0  0  0  0  SW  0.1  0.0  99:39  0 kupdated
   655 root 15  0  0  0  0  SW  0.1  0.0 34:02  0 kjournald
  3921 4dwx 15  0  3116 1588 1012 S  0.1  0.1 275:59  0 kdeinit
  19190 ldm 15  0  2912 2060 480 S  0.1  0.2  0:12  0 dcmetr
  21299 ldm 15  0  1220 1220  896 R  0.1  0.1  0:00  0 top
   1 root 15  0  500  468  440 S  0.0  0.0  0:53  0 init
```
ps –ef | grep <match>

- **ps**
  - Provides a snapshot of current process
  - Options –ef
    - e – Lists all processes
    - F – Full listing
- **grep**
  - Echoes the lines where the word or group of characters match anywhere on the line
- **| (Pipe)** Note: it is on the backslash key
  - Used direct the output from the program on the left to the program on the right
- **Example** (Next Slide)
The example below lists which processes are owned by ‘ldm’

```
[ldm@nimbus ldm]$ ps -ef | grep ldm
UID      PID     PPID  C   STIME TTY      TIME CMD
ldm      19181     1  2 Jul15  ?       00:03:07 pqact etc/pqact.gempak
ldm      19183     1  0 Jul15  ?       00:01:10 rpc.ldmd -q /ldmQueue/ldm.pq
/usr/local/ldm/etc/ldmd.conf
ldm      19188 19181  0 Jul15  ?       00:00:04 decoders/dcuaire -b 24 -m 16 -d
data/gempak/logs/dcuaire.log -e GEMTBL=/usr/gempak/gempak/tables -s
snstns.tbl data/gempak/upperair/YYYYMMDD_upa.gem
ldm      19189 19181  0 Jul15  ?       00:00:05 decoders/dcacft -e
GEMTBL=/usr/gempak/gempak/tables -d data/gempak/logs/dcacft.log
data/gempak/acft/YYYYMMDDHH_acf.gem
ldm      19190 19181  0 Jul15  ?       00:00:13 decoders/dcmetr -v 2 -a 500 -m
   72 -s sfmetar_sa.tbl -d data/gempak/logs/dcmetr.log -e
GEMTBL=/usr/gempak/gempak/tables data/gempak/surface/YYYYMMDD_sao.gem
```
df

- Displays the disk space on each mounted file system
  - Option –h
    - Human readable format

```
[ldm@nimbus ldm]$ df -h
Filesystem    Size  Used  Avail  Use%  Mounted on
/dev/sda8     2.0G   912M  1001M  48%   /
/dev/sda3     190M   12M   169M   7%   /boot
none          501M     0  501M    0%   /dev/shm
/dev/sda7     1012M  40M   921M   4%   /tmp
/dev/sda5     9.7G   3.1G   6.1G   34%   /usr
/dev/sda9     9.7G  226M   8.9G   3%   /var
/dev/sda10    193G  169G   15G   92%   /data
/dev/sda11    2.0G  1.9G   65M   97%   /ldmQueue
/dev/sda12    7.7G  33M   7.3G   1%   /ftp
/dev/sda2     2.5G  650M  1.8G  28%   /home
```
Users

- When using ldmadmin you must be logged in as “ldm”.
  - ldm can only be logged in from root
- When using pdinrs you must be logged in as pdinrs on NOAAPORT
  - pdinrs can only be logged in from root
None or Old Data

Check Data Flow-

```
su ldm
ldmadmin watch
```

Data Flow!

```
ps -ef | grep pqact
```

Pqact running!

```
df -h
```

Full Disk!

Goto slide “Full Disk”

If not Full

Email support

No Data Flow!

Goto slide “No Data Flow”

pqact not running!

```
ldmadmin restart
```

Full Disk!

Goto slide “Full Disk”

If not Full

Email support
Full Disk

`ldmadmin stop
scour`

*Note: wait for scour to finish*

`ldmadmin start`

*must be logged in as ldm to run scour*
No Data Flow

Is ldm server running?
ps –ef | grep rpc.ldmd

ldm running!
Check NOAAPORT data Feed

ldm not running
ldmadmin start

No ldm server error on startup
Check ldm data flow!
ldmadmin watch

Idm server error on startup
Goto Slide “Idm error on startup”

Data flowing!
Check for new data using N-AWIPS
(Test using NWX and choose SFC Hourlies)

Data still not flowing
Goto slide “check NOAAPORT data feed”
Ldm error on startup

Goto slide “LDM dies gracefully”

Ldm started okay
Idmadmin watch

Ldm did not start
Goto slide “LDM dies abruptly”

Ldm started okay
Idmadmin watch

Ldm did not start
Goto Slide “Rebuild LDM Queue”

Ldm started okay
Idmadmin watch

Idm did not start
Email Support
ldmadmin start

Error Example

(when ldm dies gracefully)

[ldm@nimbus ldm]$ ldmadmin start
Jul 15 23:06:47 UTC nimbus.dpg.army.mil : start_ldm: PID-file "/usr/local/ldm/ldmd.pid" exists. Verify that all is well and then execute
  ldmadmin clean (Process ID needs to be removed)
to remove the PID-file
[ldm@nimbus ldm]$ ldmadmin clean
[ldm@nimbus ldm]$ ldmadmin start
The product-queue is OK./usr/local/ldm/etc/pqact.gempak is syntactically correct
Starting the LDM server...
[ldm@nimbus ldm]$ [ldm@nimbus ldm]$ ldmadmin watch
(Type ^D when finished)
Jul 15 23:15:29 pqutil: 148 20050715231526.420 IDS|DDPLUS 236 NXUS60 PHFO 152315 /pGSMHKM
Jul 15 23:15:29 pqutil: 1237 20050715231526.422 NNEXRAD 237 SDUS54 KMEG 152310 /pNVLNQA
ldmadmin start

Error Example
(when ldm dies abruptly)

[ldm@nimbus ldm]$ ldmadmin start
   Verify that all is well and then execute
       ldmadmin clean
 to remove the PID-file
[ldm@nimbus ldm]$ ldmadmin clean
[ldm@nimbus ldm]$ ldmadmin start
 The writer-counter of the product-queue is not zero. Either
 a process has the product-queue open for writing or the queue
 might be corrupt. Terminate the process and recheck or use
       pqcat -l- -s -q /ldmQueue/ldm.pq && pqcheck -F -q /ldmQueue/ldm.pq
 to validate the queue and set the writer-counter to zero.
[ldm@nimbus ldm]$ pqcat -l- -s -q /ldmQueue/ldm.pq && pqcheck -F -q /ldmQueue/ldm.pq
 Jul 15 23:27:38 pqcat: Starting Up (19380)
 Jul 15 23:38:04 pqcat: Starting Up (19505)
 Jul 15 23:38:04 pqcat: pqcat queueSanityCheck: Number of products tallied consistent with
 value in queue
Jul 15 23:38:04 pqcat: Exiting
 Jul 15 23:38:04 pqcat: Number of products 206269
 Jul 15 23:38:04 pqcheck: Starting Up (19505)
 Jul 15 23:38:04 pqcheck: Exiting
[ldm@nimbus ldm]$ ldmadmin watch (Verify)
Rebuild LDM Queue File

1. Log in as ldm
2. ldmadmin delqueue
3. ldmadmin mkqueue (Takes a few minutes)

Notes:
- Rebuilding the queue destroys all the data in the queue
- LDM server tries to recover this lost data from the NOAAPORT LDM queue
  - May slow Metbox for serveral minutes to retreive and process data
- This option is done as the last resort!
Metbox Running Slow

Check System Load

- uptime

Load > 2.0
- Close all window apps and recheck in 10 minutes

Load < 2.0
- Recheck system load in 10 minutes

System running slow
- Check to see if scour is running
  - ps –ef | grep scour

System running normal
- Do nothing

If not running
- Reboot Metbox

If running
- Wait for it to finish, and then recheck system load

Do nothing
Two data processing system servers

- pdinrs
  - Retrieves data from the NOVRA-75 box
    - This box is the middle man between the dish and the NOAAPORT computer
  - Sends data to the LDM server

- LDM
  - Distributed data to other LDM servers
    - 4DWX
    - Metbox
```
pdinrs*
dpg-nport pdinrs $ pdinrs --help
pdinrs: NOAAPort Receive System arguments:
  -V, --version     : print current pdinrs software version number;
  -c <file>, --config=<file> : configuration file for pdinrs;
  -e, --exit        : exit pdinrs - stops all processing;
  -h, --help        : what you are seeing now;
  -i, --info        : pdinrs compliment to UNIX top;
  -j, --info-extra  : like --info, but with demod and frame loss info;
  -k, --kill        : force stop pdinrs immediately;
  -m, --reset       : reset the stats counters;
  -q, --quiet       : turn off logging;
  -r, --restart     : stop processing, reread configuration, and restart;
  -s, --status      : returns message on pdinrs running status;
  -t <list>, --restart_channel=<list> : restart a <list> of channels
  where <list> is a comma delimited list (with no spaces);
  -v, --verbose     : turn on logging.
  -w, --watch       : analogous to Linux 'w' or UNIX 'uptime'.
```

*Must be logged in as pdinrs
In the screen numbers should be changing, and NWSTG channels will be more active than the GOES channel
pdinrs -j
MakeGraphs
Checking NOAAPORT DATA Flow Part I

Checking NOAAPORT Data Flow

Is LDM running?

Ldm is running! Check pdinrs

Ldm is NOT running

Check Ldm “See Metbox Ldm instructions”

pdinrs is running

pdinrs –i

Goto slide check data flow part II

pdinrs NOT running

Start pdinrs

pdinrs –i

Goto slide check data flow part II
Checking NOAAPORT

Data flow Part II

Check pdinrs data flow
pdinrs -i

Data is flowing!

Data NOT Flowing
Restart pdinrs
pdinrs -r
pdinrs -i

Data NOT Flowing
Check Satellite Feed
Makegraphs

Loss Of Frames
1. Email Support
2. Realign Dish

No Loss of Frames
Email Support
Conclusion

- More info on LDM and NAWIPS
  http://www.unidata.ucar.edu
- Questions?