



Metbox Components



- **Metbox**
 - Hardware and software
 - **LDM**
 - Data management system
 - **GENERAL Meteorological PACKage (GEMPAK)**
 - A suite of applications and configuration files that decodes, analyze, 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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A TEC Forecasters Conference
Boulder Colorado 25 July 2006



Topics



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



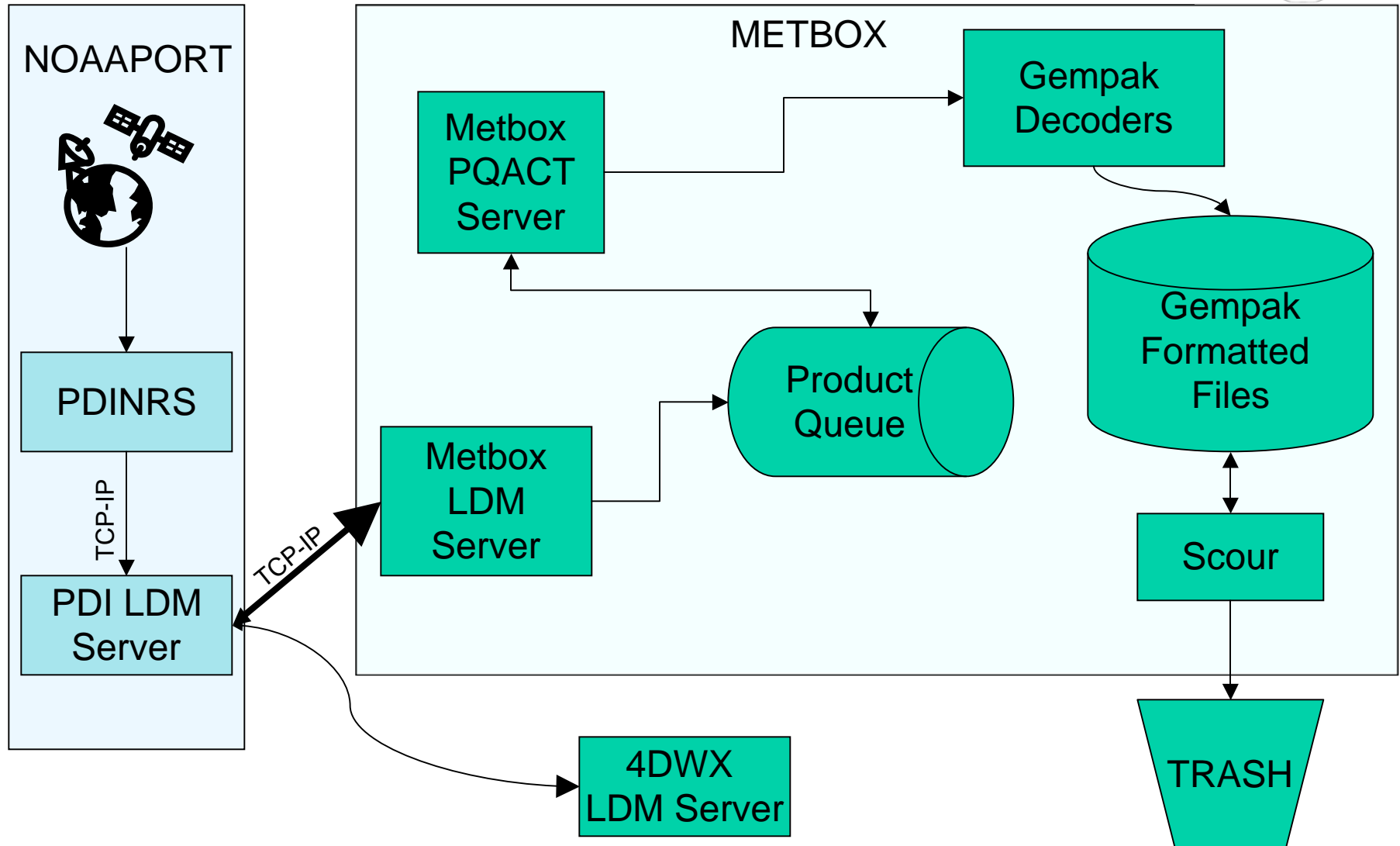
What is LDM?



- 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.

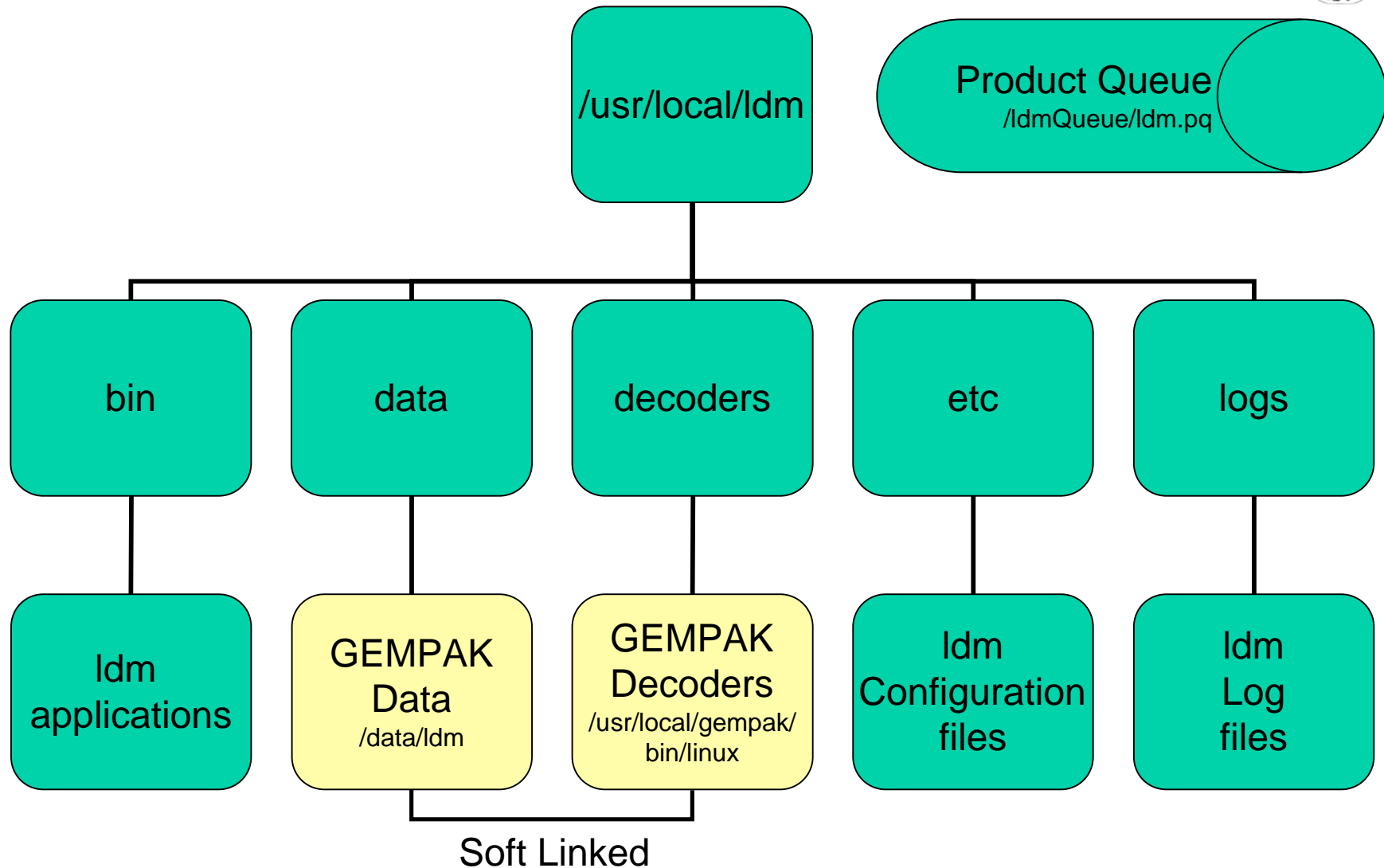


Metbox Data Flow





LDM Directory Structure





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



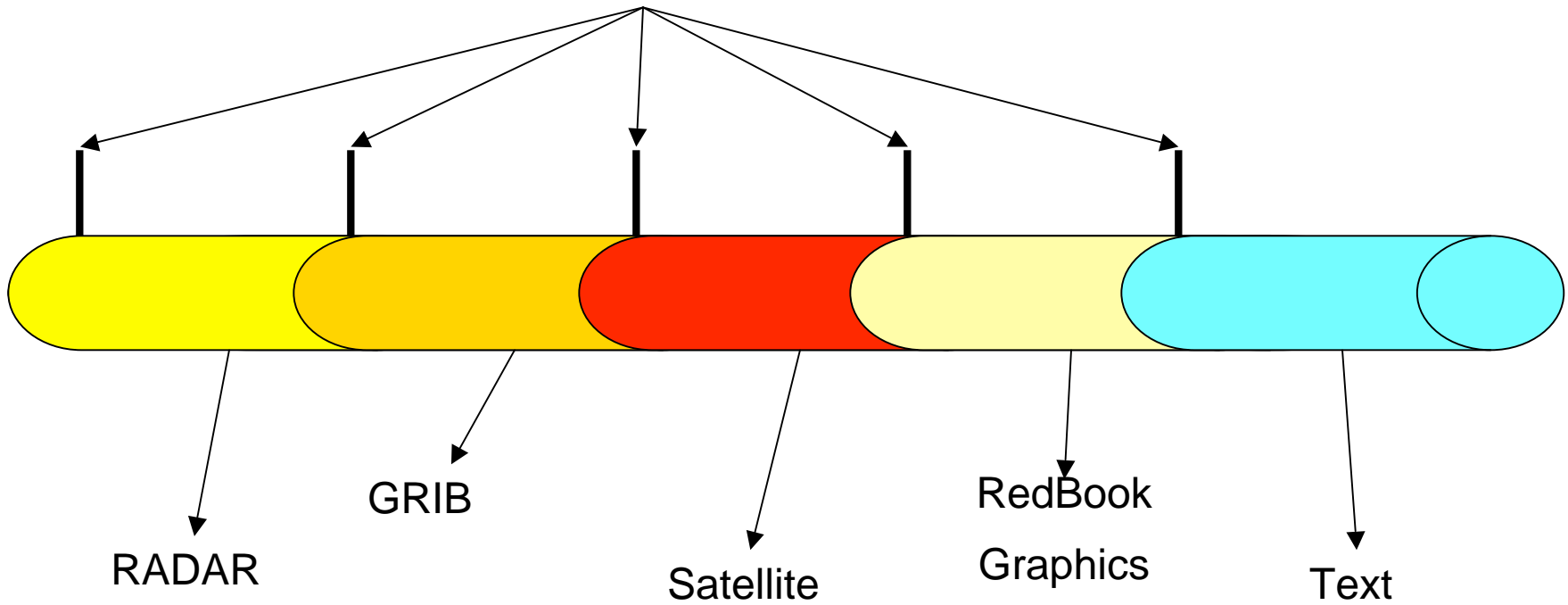
- A server that—
 1. reads the contents of the product queue
 2. directs the content of queue to—
 - decoders, standard output, database, etc.
- Time driven, e.g., reads the product queue on a time interval
 - Metbox is set to 15 seconds (Default)
- Started and stopped by the ldm server on startup and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



Product Queue



Headers





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



top



- 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  pgact
   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)



ps -ef | grep <match> Example



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/dcucair -b 24 -m 16 -d
data/gempak/logs/dcucair.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
```

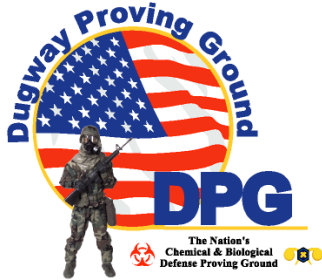


df



- 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   5% /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
```



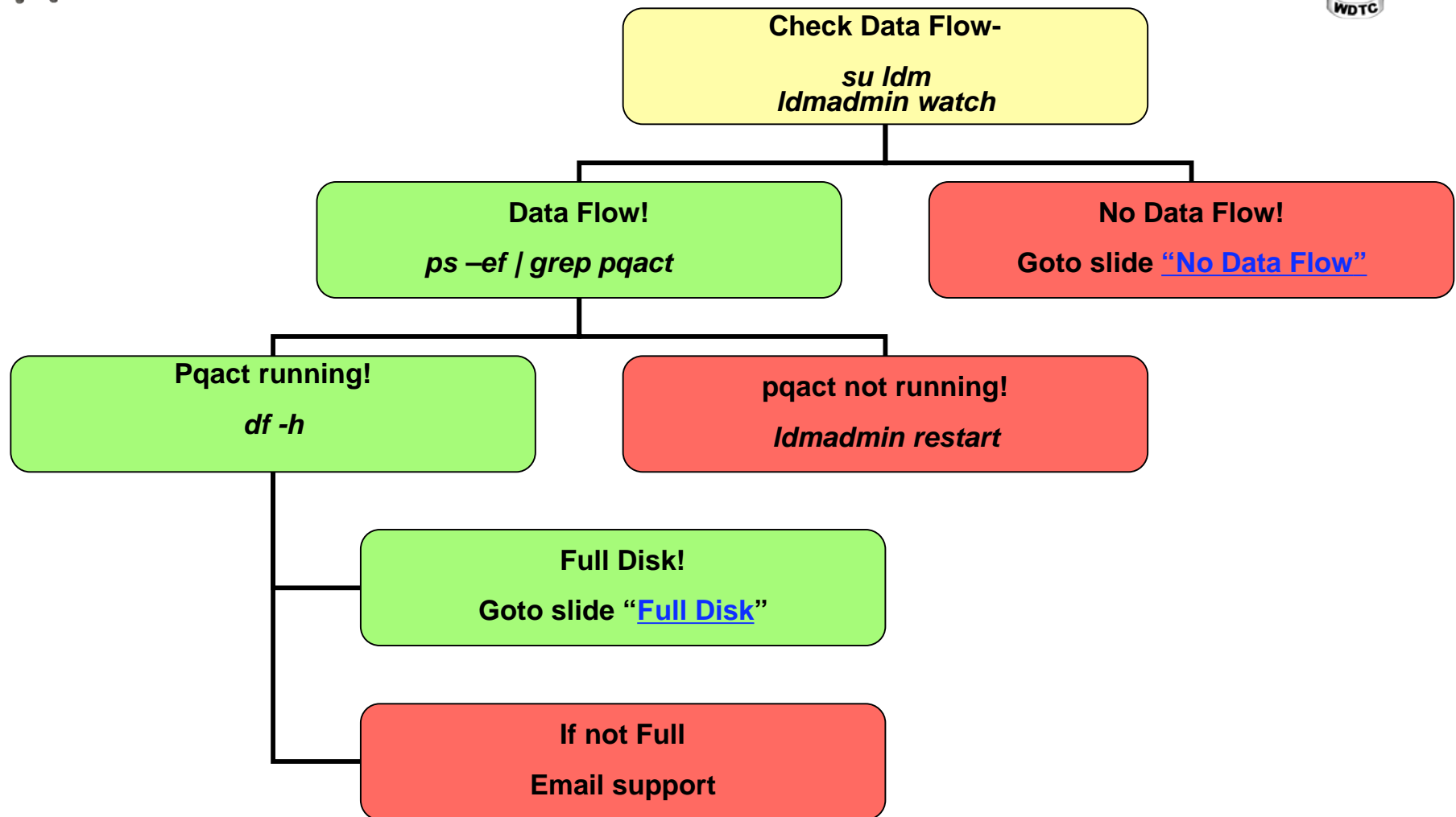
Users



- 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





Full Disk



Idmadmin stop

scour*

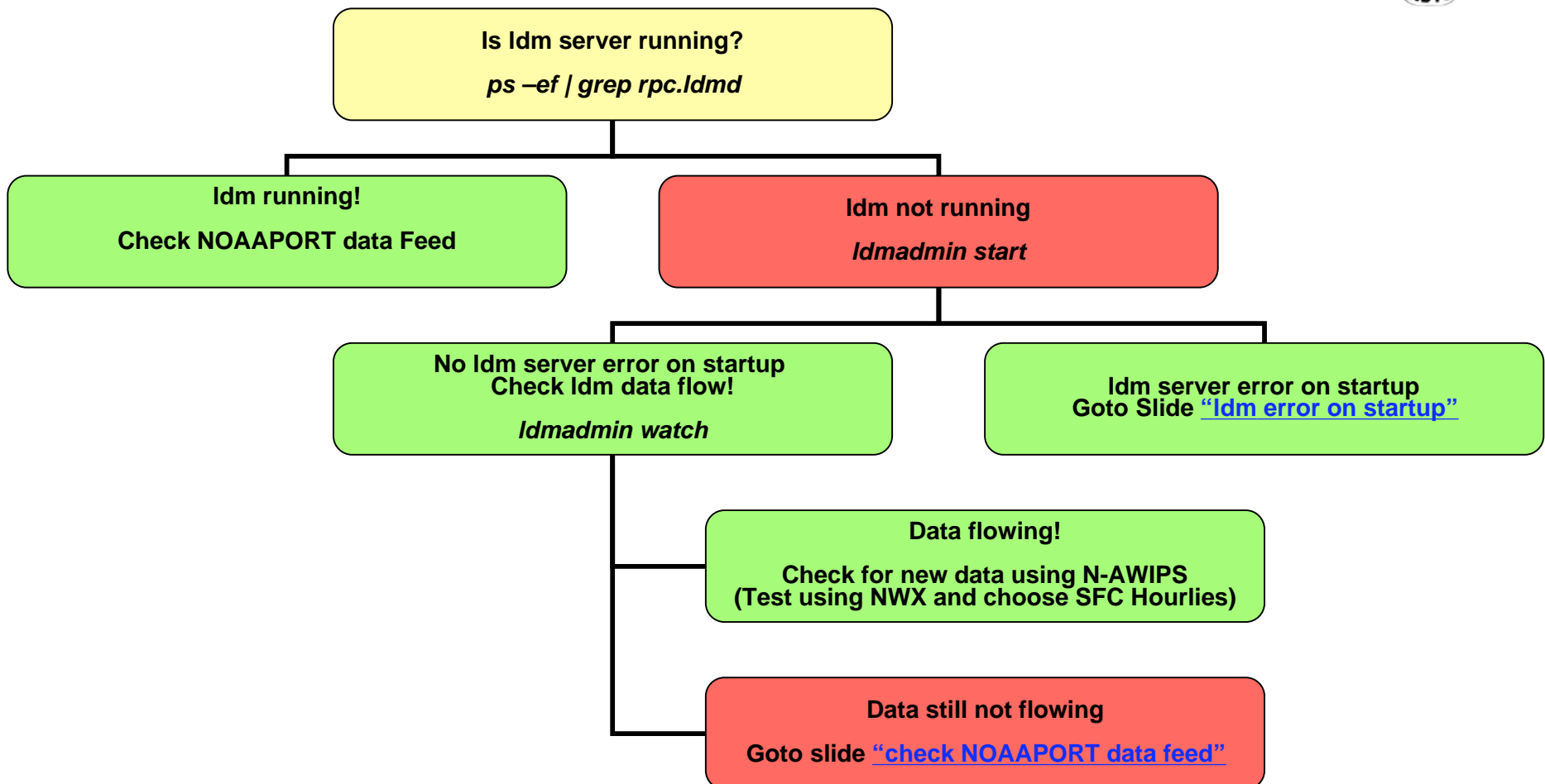
Note: wait for scour to finish

Idmadmin start

*must be logged in as Idm to run **scour**

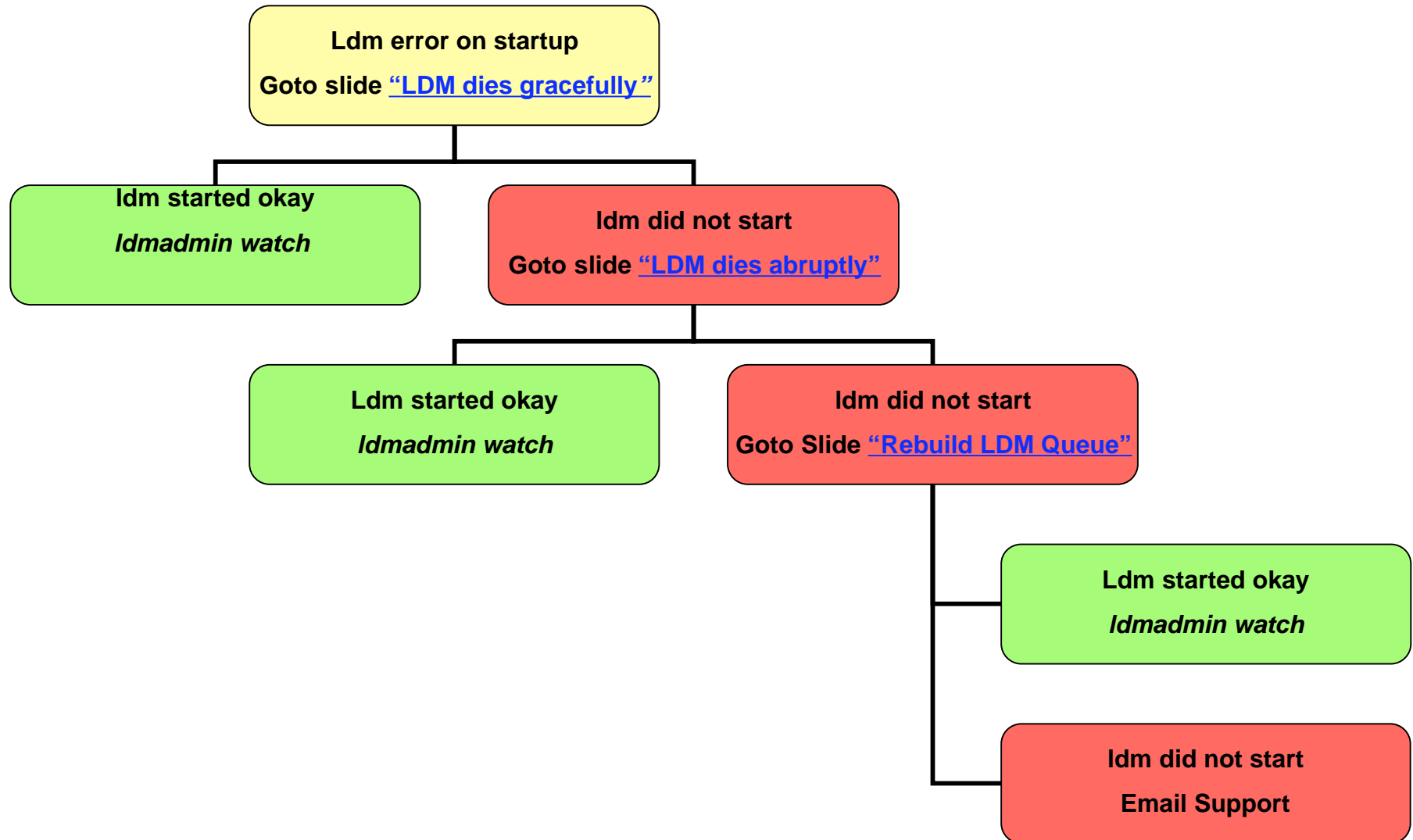


No Data Flow





ldm error on startup





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/pgact.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:      8472 20050715231526.406 NNEXRAD 235  SDUS25 KABQ 152312 /pN2SFDX
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
Jul 15 23:21:25 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
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.
Jul 15 23:21:57 UTC nimbus.dpg.army.mil : LDM not started
[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: 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



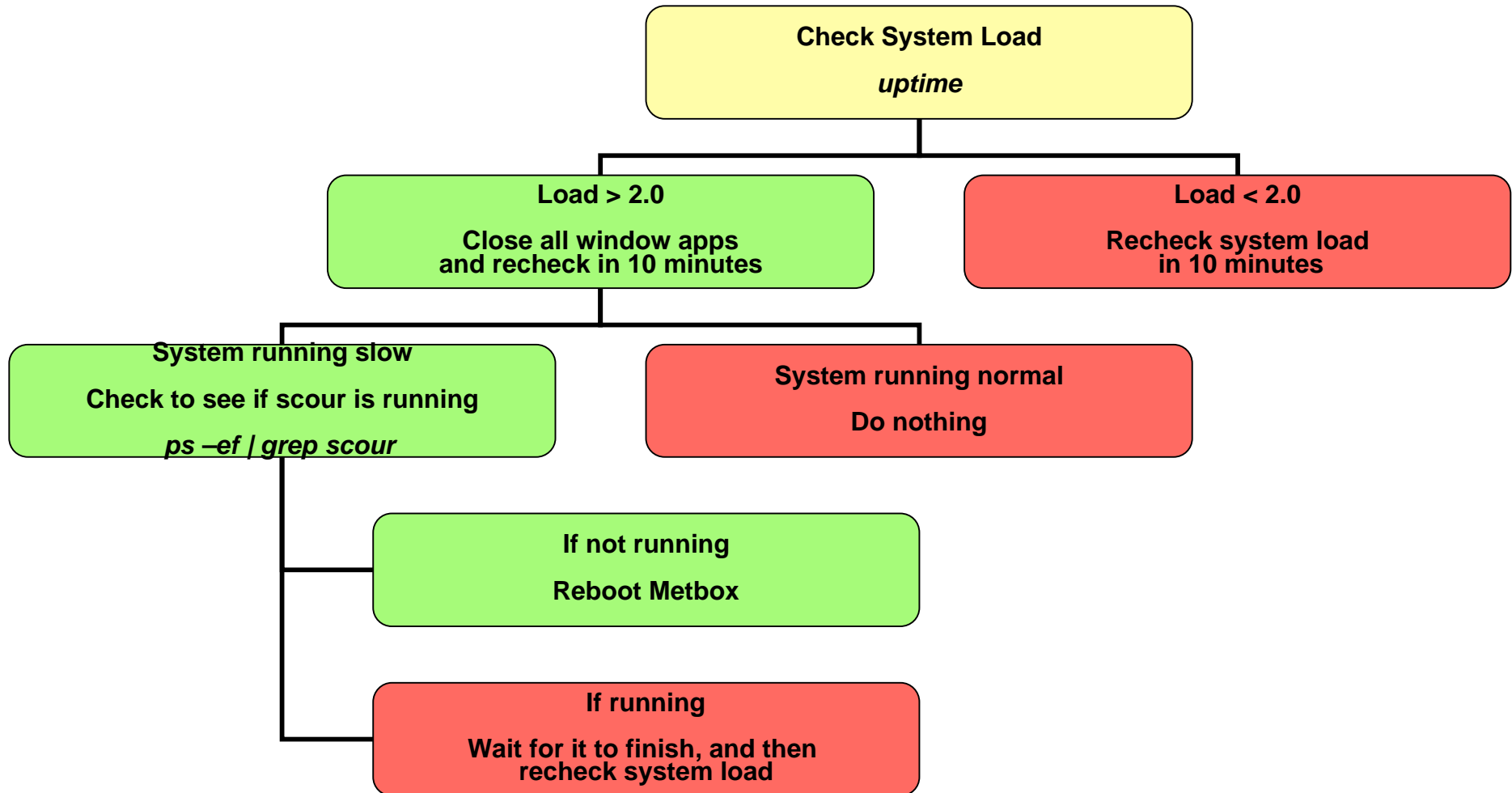
1. Log in as ldm
2. `ldmadmin delqueue`
3. `ldmadmin mkqueue` (Takes a few minutes)

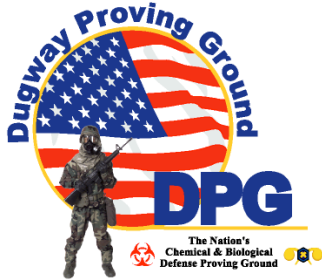
Notes:

- 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 several minutes to retrieve and process data
- This option is done as the last resort!



Metbox Running Slow





NOAAPORT



- 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
 - Distributes 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**



pdinrs -i



```
140.196.88.7 - default - SSH Secure Shell
File Edit View Window Help
Quick Connect Profiles
PDINRS: Total time alive = 380.608 hours, for 4 channel(s) 20050722 17:41:33 GMT
-----
NWSTG          Latest message = SAUS80 KWBC 221740 : METAR      Open Actions = 1
(latest product size) Peak at 20050712 23:43:47 GMT      Current
      244 bytes      (bytes/sec)      (kbits/sec)      (bytes/sec)      (kbits/sec)
Inbound Data Rate      487982.4469      3903.8596      12467.4775      99.7398
Outbound Data Rate     4182078.0225     33456.6242     11985.8839     95.8871
-----
GOES           Latest message = TIGW03 KNES 221730      Open Actions = 1
(latest product size) Peak at 20050713 20:40:37 GMT      Current
      783677 bytes   (bytes/sec)      (kbits/sec)      (bytes/sec)      (kbits/sec)
Inbound Data Rate      521286.2898     4170.2903      0.0000      0.0000
Outbound Data Rate     516618.1737     4132.9454      0.0000      0.0000
-----
NWSTG2         Latest message = LHR50 KWBC 221200      Open Actions = 1
(latest product size) Peak at 20050710 20:40:04 GMT      Current
      5347 bytes     (bytes/sec)      (kbits/sec)      (bytes/sec)      (kbits/sec)
Inbound Data Rate      631523.0999     5052.1848      0.0000      0.0000
Outbound Data Rate     625789.9559     5006.3196      0.0000      0.0000
-----
DCP            Latest message = SXUT50 KWAL 221739      Open Actions = 1
(latest product size) Peak at 20050715 01:47:11 GMT      Current
      124 bytes      (bytes/sec)      (kbits/sec)      (bytes/sec)      (kbits/sec)
Inbound Data Rate      279449.5857     2235.5967      1707.0592     13.6565
Outbound Data Rate     276837.7616     2214.7021     1063.6023     8.5088
-----
Connected to 140.196.88.7
SSH2 - aes128-cbc - hmac-md5 - none 99x27 NUM
```

In the screen numbers should be changing, and NWSTG channels will be more active than the GOES channel



pdinrs -j



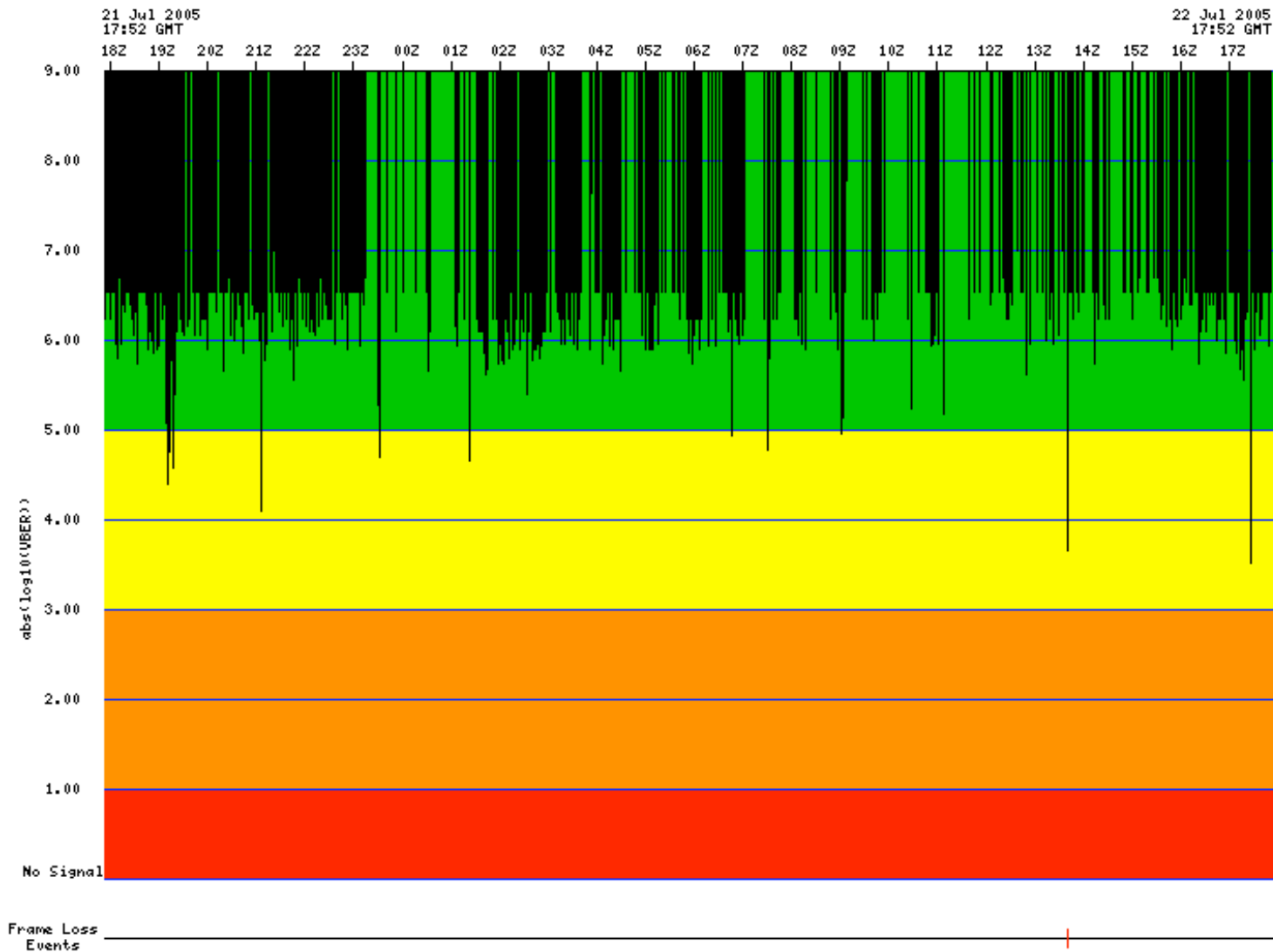
```
140.196.88.7 - default - SSH Secure Shell
File Edit View Window Help
Quick Connect Profiles
PDINRS: Total time alive = 380.721 hours, for 4 channel(s) 20050722 17:48:19 GMT
-----
NWSTG   Latest message = OKSX88 KWBK 221200 NCF/Local Wait =      2/      1
Data Rate: Inbound = 3553.1230 (kbits/sec) | Outbound = 3516.0985 (kbits/sec)
Demodulator Stats: EB/NO = >19.0 dB          | Viterbi BER = <1.0e-08
Total Frames = 31046633 | Missing Frames =      4 | Percent Lost = 0.00001
-----
GOES    Latest message = TIGQ59 KNES 221720 NCF/Local Wait =      1/      1
Data Rate: Inbound =      0.0000 (kbits/sec) | Outbound =      0.0000 (kbits/sec)
Demodulator Stats: Receiver Logging is Turned Off
Total Frames = 10998317 | Missing Frames =     12 | Percent Lost = 0.00011
-----
NWSTG2  Latest message = LHR50 KWBC 221200 NCF/Local Wait =      1/      0
Data Rate: Inbound =      0.0000 (kbits/sec) | Outbound =      0.0000 (kbits/sec)
Demodulator Stats: Receiver Logging is Turned Off
Total Frames = 7632728 | Missing Frames =      0 | Percent Lost = 0.00000
-----
DCP     Latest message = SRCA60 KWAL 221746 NCF/Local Wait =      1/      1
Data Rate: Inbound = 43.3992 (kbits/sec) | Outbound = 28.3240 (kbits/sec)
Demodulator Stats: Receiver Logging is Turned Off
Total Frames = 7152193 | Missing Frames =     11 | Percent Lost = 0.00015
-----
Connected to 140.196.88.7
SSH2 - aes128-cbc - hmac-md5 - none 89x24 NUM
```



MakeGraphs

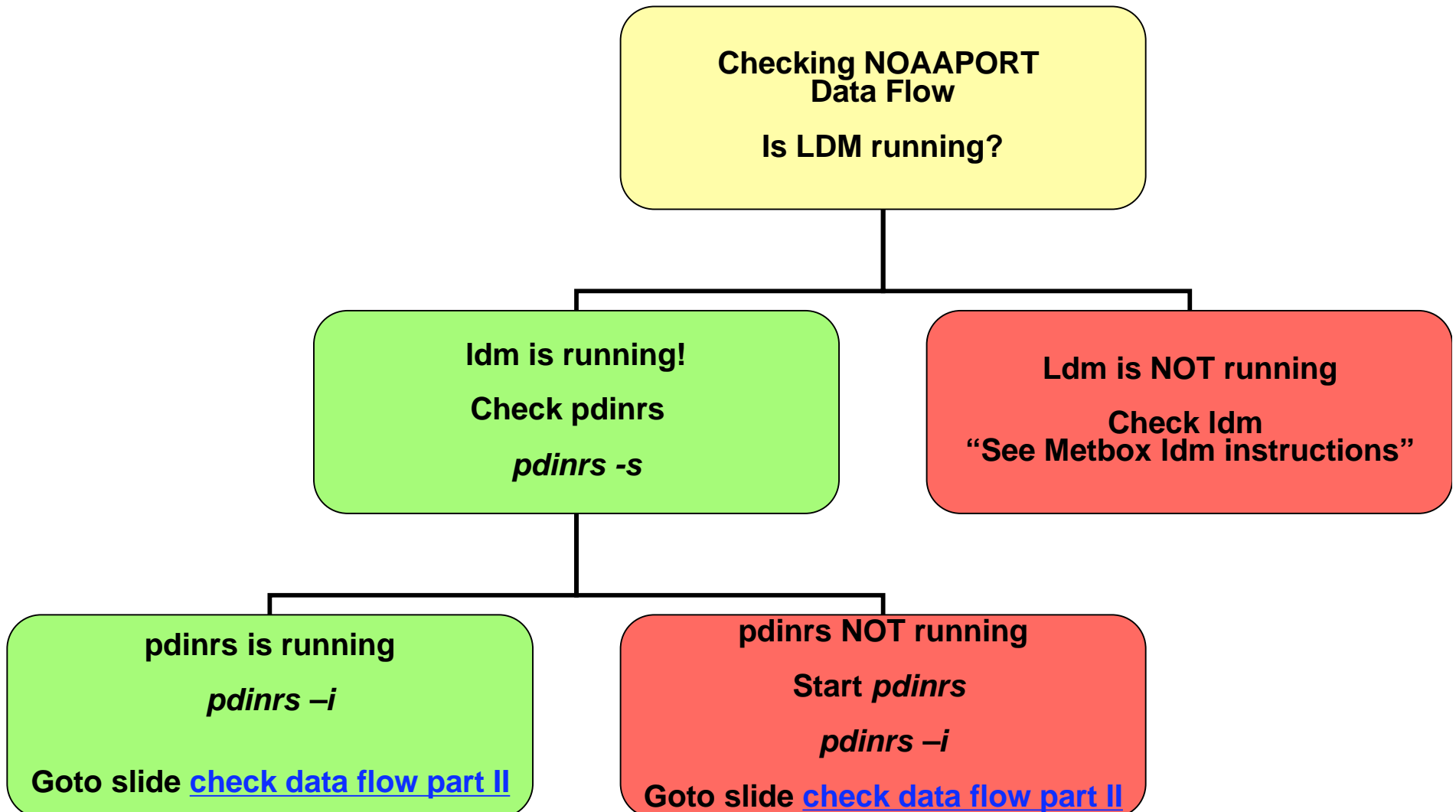


NWSTG



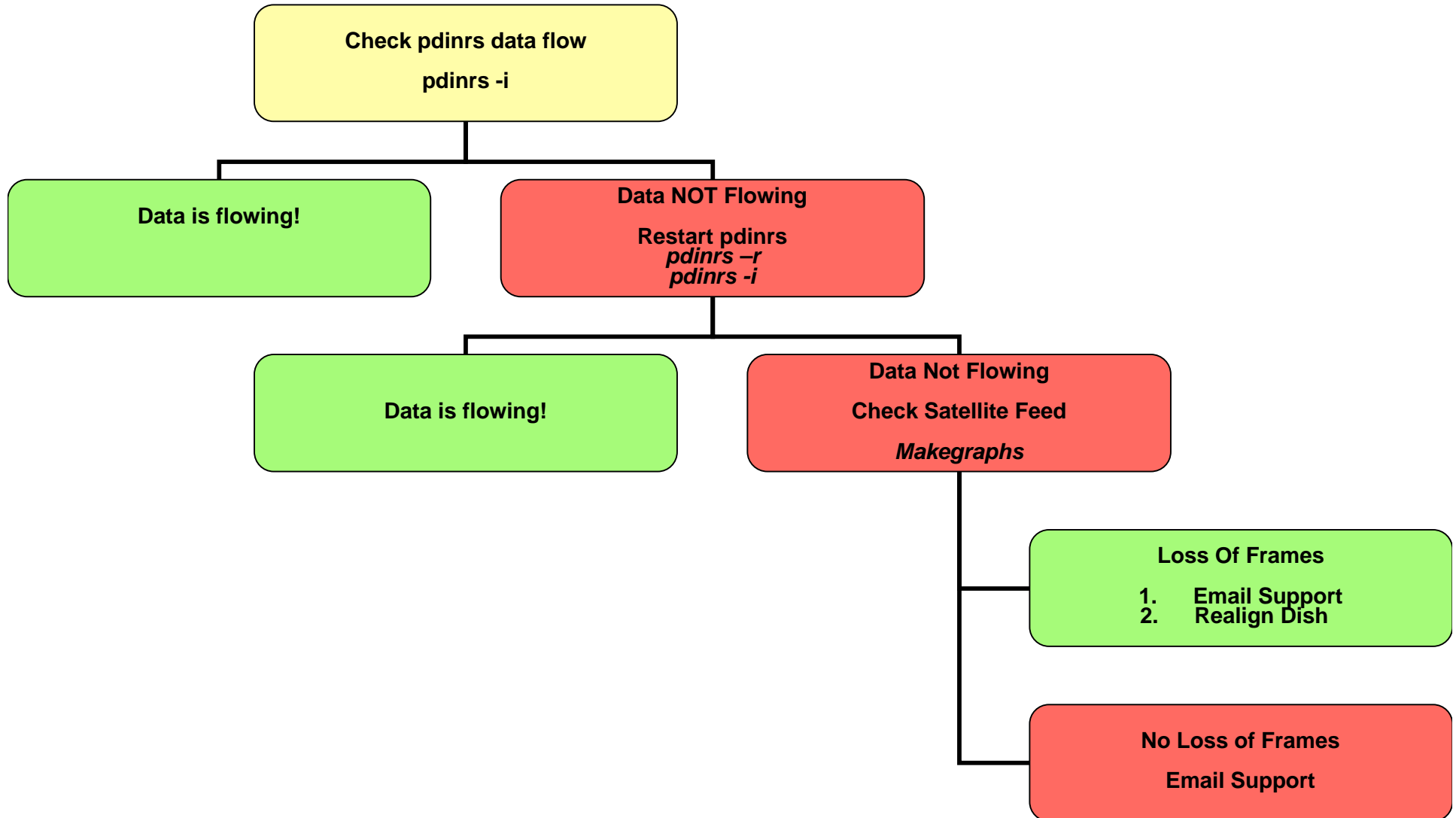


Checking NOAAPORT DATA Flow Part I





Checking NOAAPORT Data flow Part II





Conclusion



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