

A diagram consisting of six circles arranged in a 2x3 grid. The top row contains three circles: the left one is an outline, the middle one is solid light purple, and the right one is solid light purple. The bottom row contains three circles: the left one is solid light purple, the middle one is solid light purple, and the right one is an outline. The text 'Operational Cube' is centered over the top row of circles.

Operational Cube

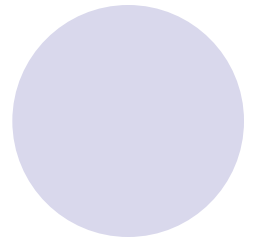
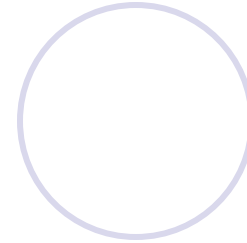
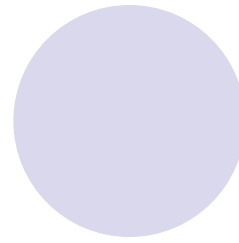
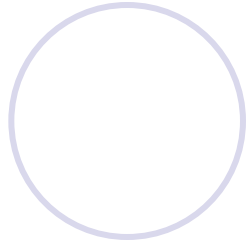
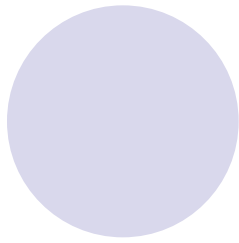
Sri Earanti

Lloyds International

Overview



- SAS solution at Lloyds
- Complex schedule and impacts
- Operational Monitoring of the system
- Proactive monitoring and how to do it
- Cool SAS features



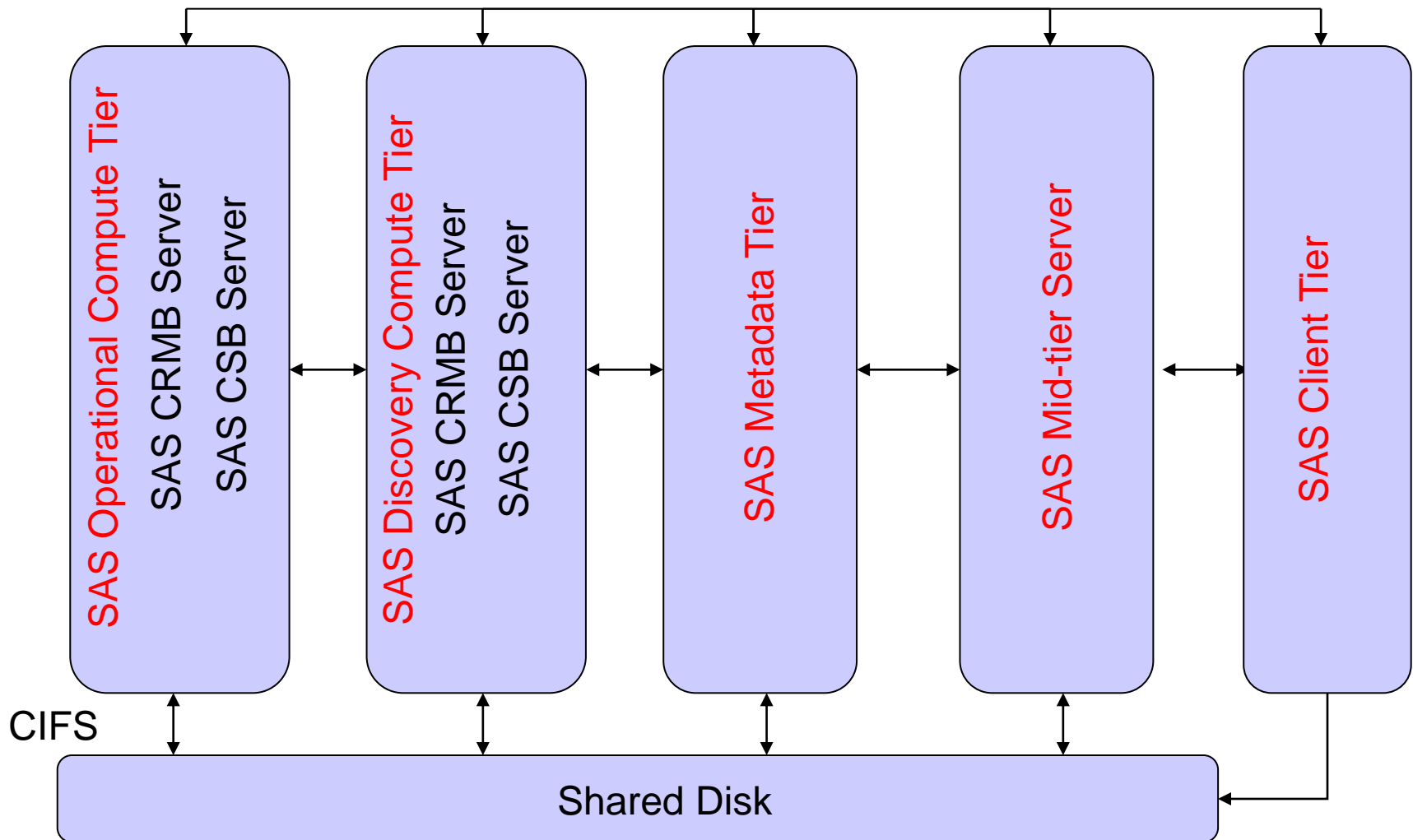
- Lloyds International Pty Ltd is a subsidiary of Lloyds Banking Group plc . Lloyds Banking Group, with its head office in the UK, is one of the world's largest financial services organisations.
- In Australia, Lloyds operates through brands like
 - Capital Finance
 - BOS International

SAS CRMB Solution



- The recent global financial crisis reinforced that enterprise risk management in financial institutions is complex.
- SAS Risk Management for Banking provides data management, advanced analytics and reporting.
- This allows organizations to measure exposure and risk across all risk types and business optimally.

- Lloyds Implemented SAS CRMB on
 - Virtualised Windows 2008 servers (VMWare)





- **Complex schedule**

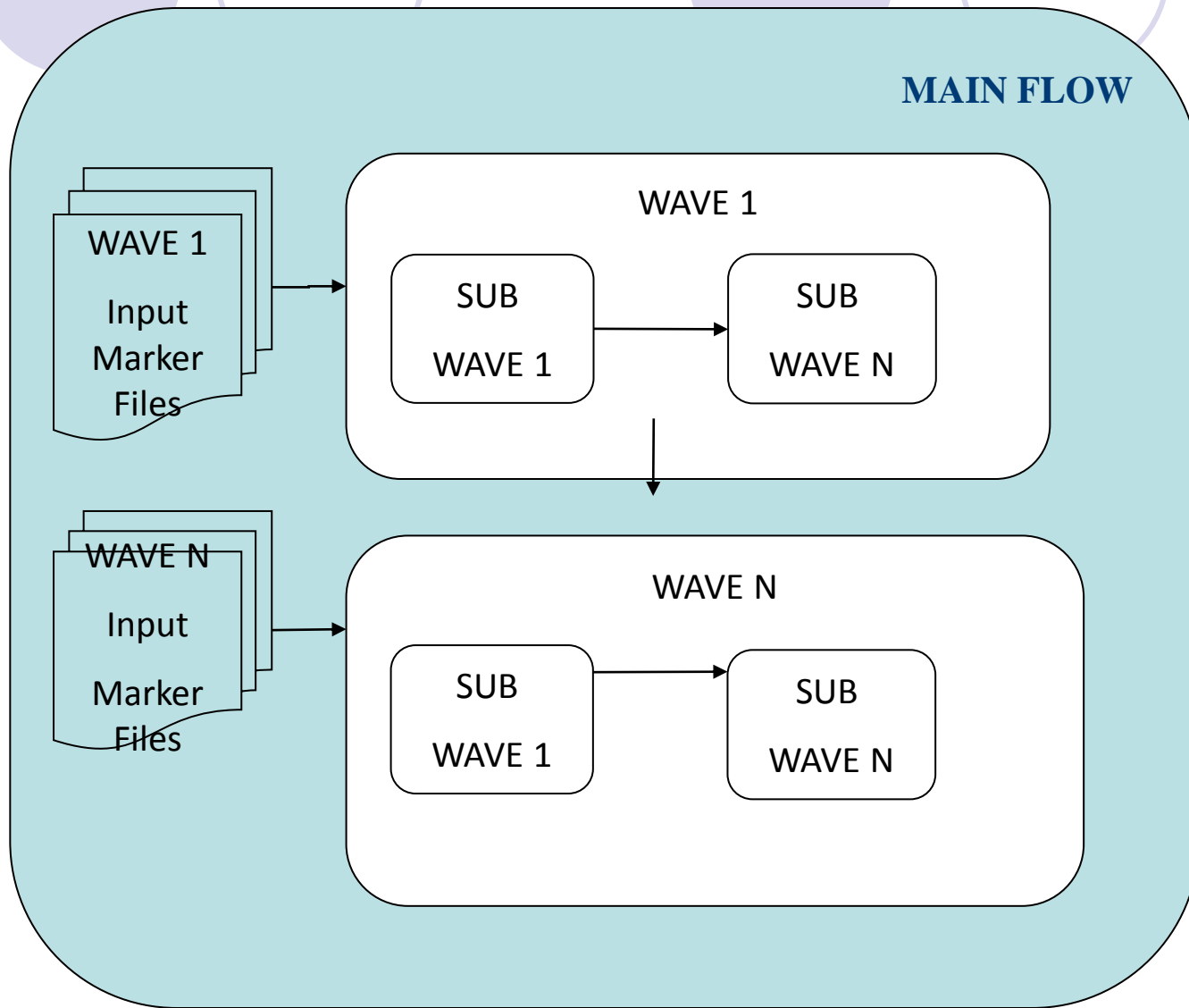
- Runs nightly Tue-Sat

- 495 jobs

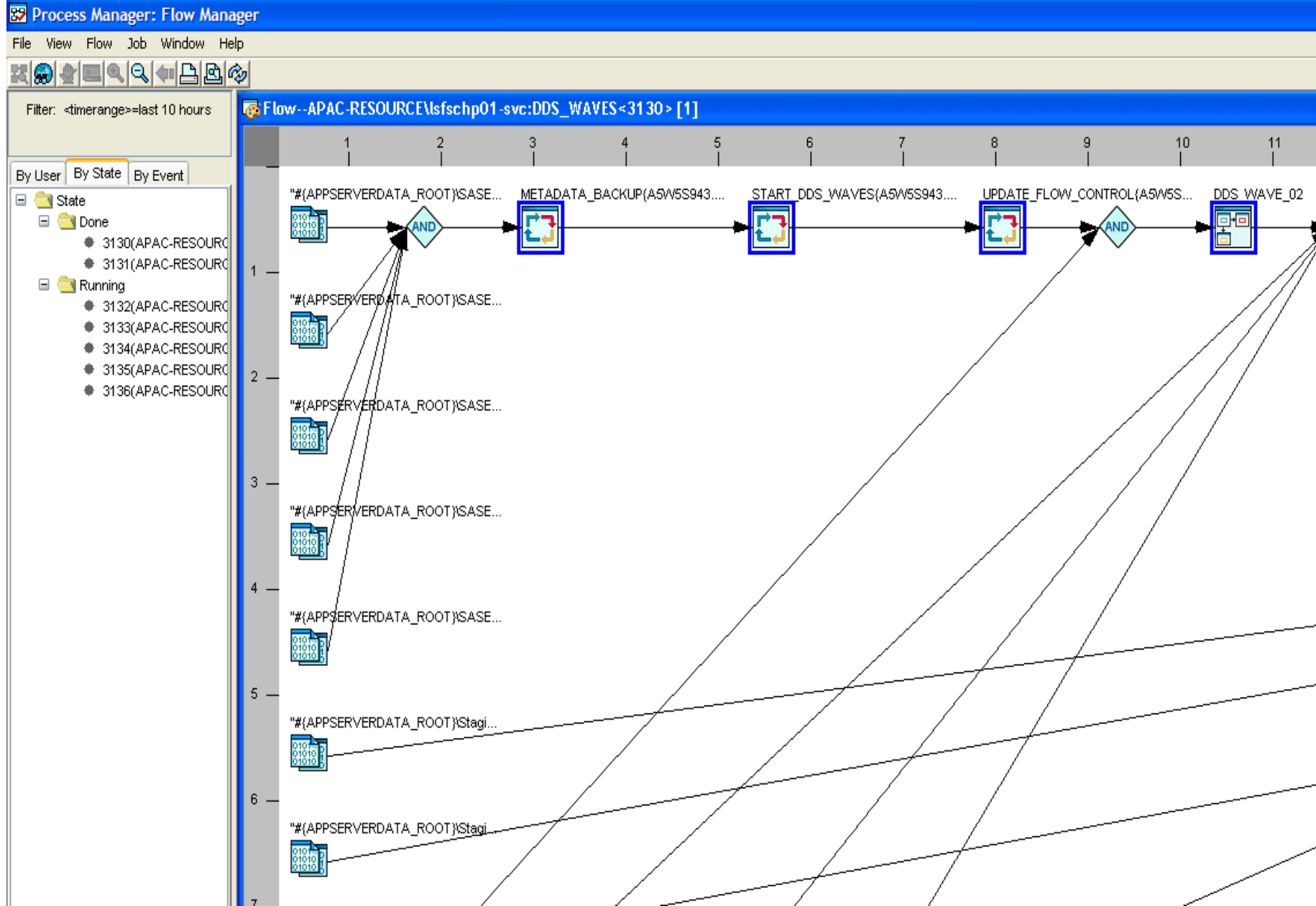
- 7 major flows – which include Waves and Sub Waves

- Scheduled in Platform LSF

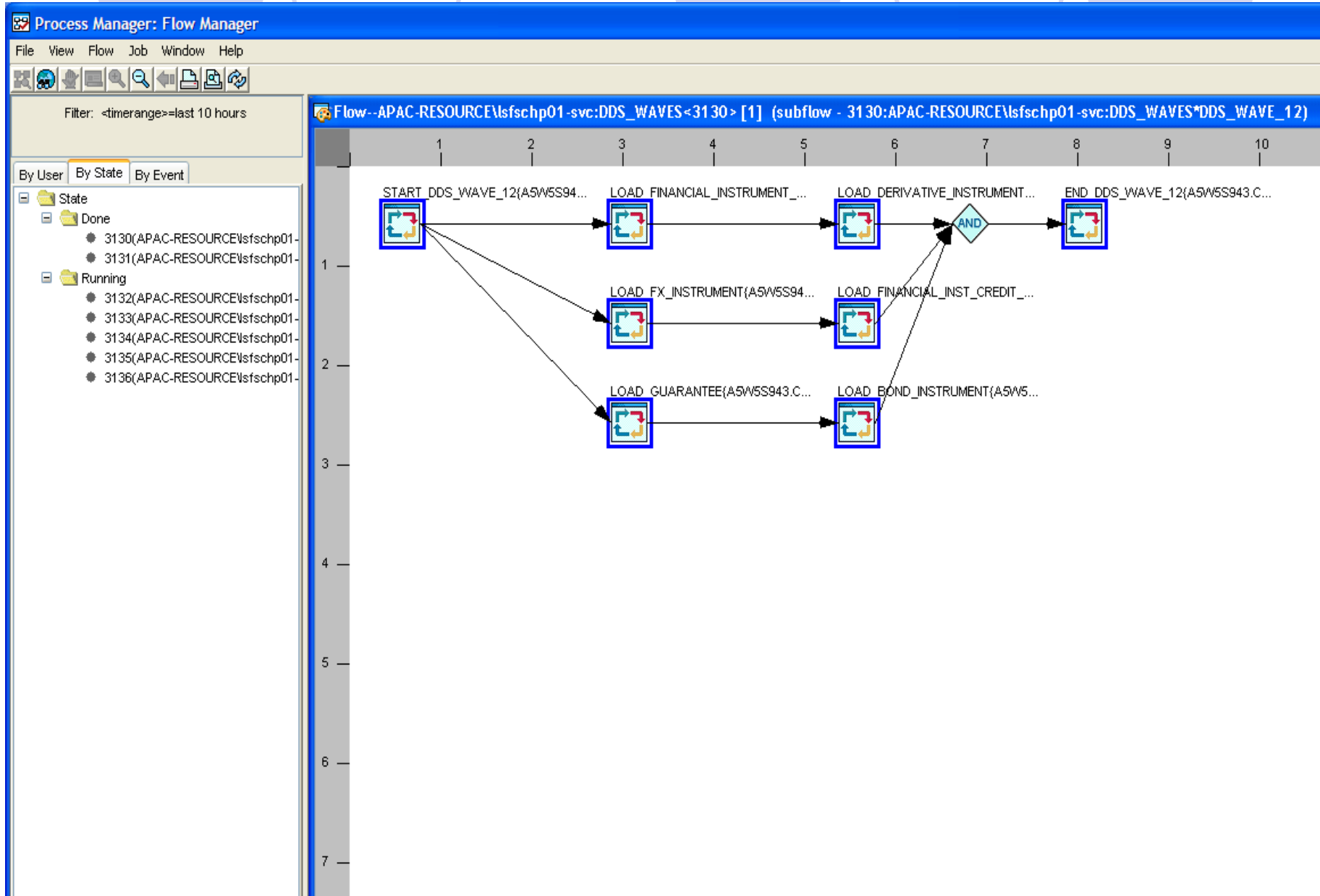
Flows, Waves and Subwaves



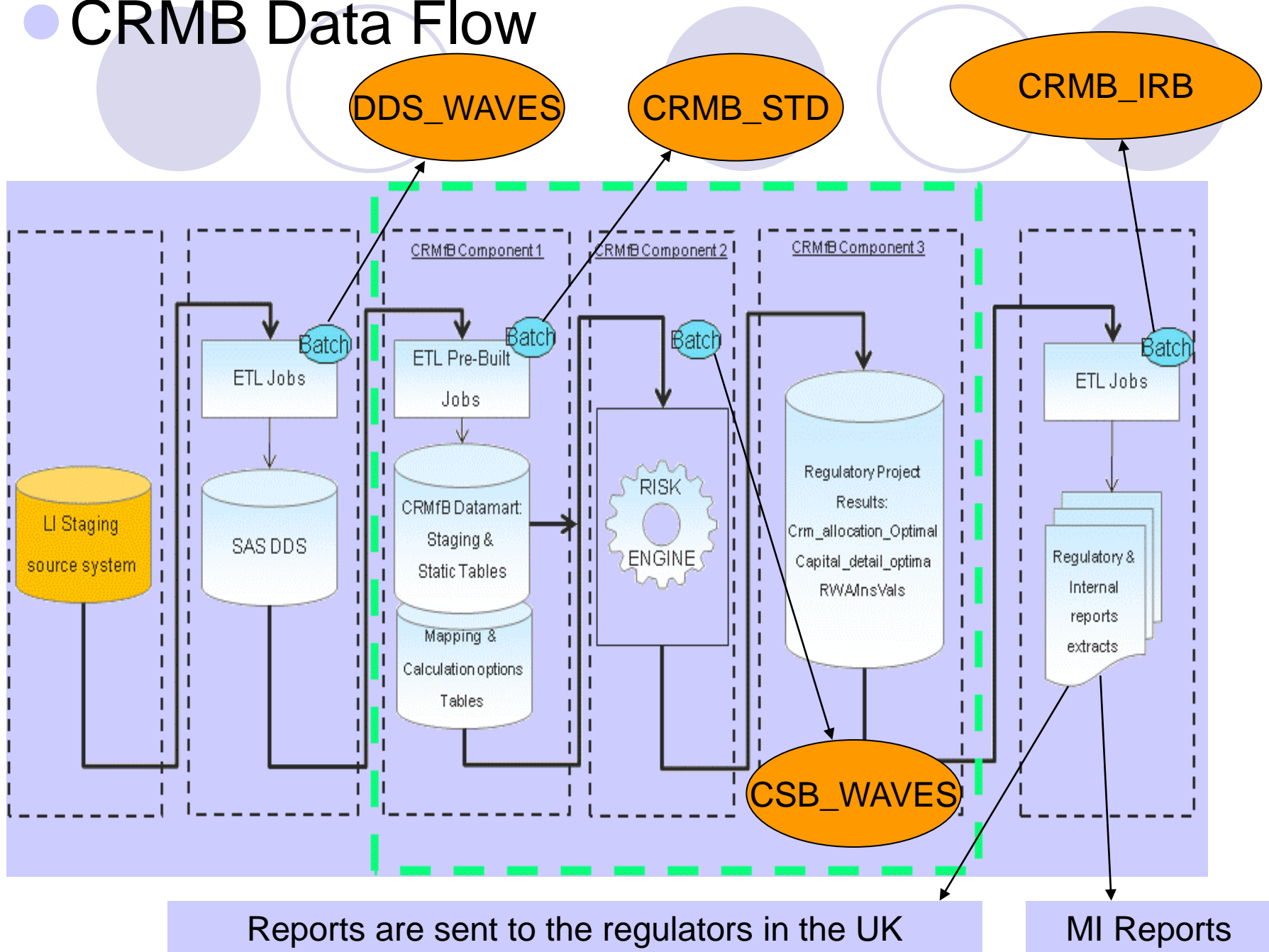
Waves – A wave is a logical grouping of jobs based on their processing precedence dictated by the solutions ETL framework.




Sub Waves – Waves are broken down into smaller sub waves which contain a manageable subset of jobs: WAVE_1 and WAVE_2



CRMB Data Flow



- 
- **Complex schedules come with performance issues**
 - Performance Issues – Hardware tuning/
Application tuning
 - Hardware Tuning
 - CPU
 - Memory
 - Disk I/O
 - Network

Application tuning



- Schedule is taking a long time
 - How was it before?
 - What is the trend/average?
- Individual job runtimes has increased
 - How long was it before?
 - When did the runtime start to increase?
 - Which jobs are these?
- **Capture Facts on how the application is performing in the environment – monitoring**

Application tuning



- Pointers for proactive monitoring
 - Should be able to produce runtime information at the end of every run and be readily available
 - Automated reporting
 - Can be grouped at waves, sub waves and job level
 - Should be able to add more metrics



Operational Cube

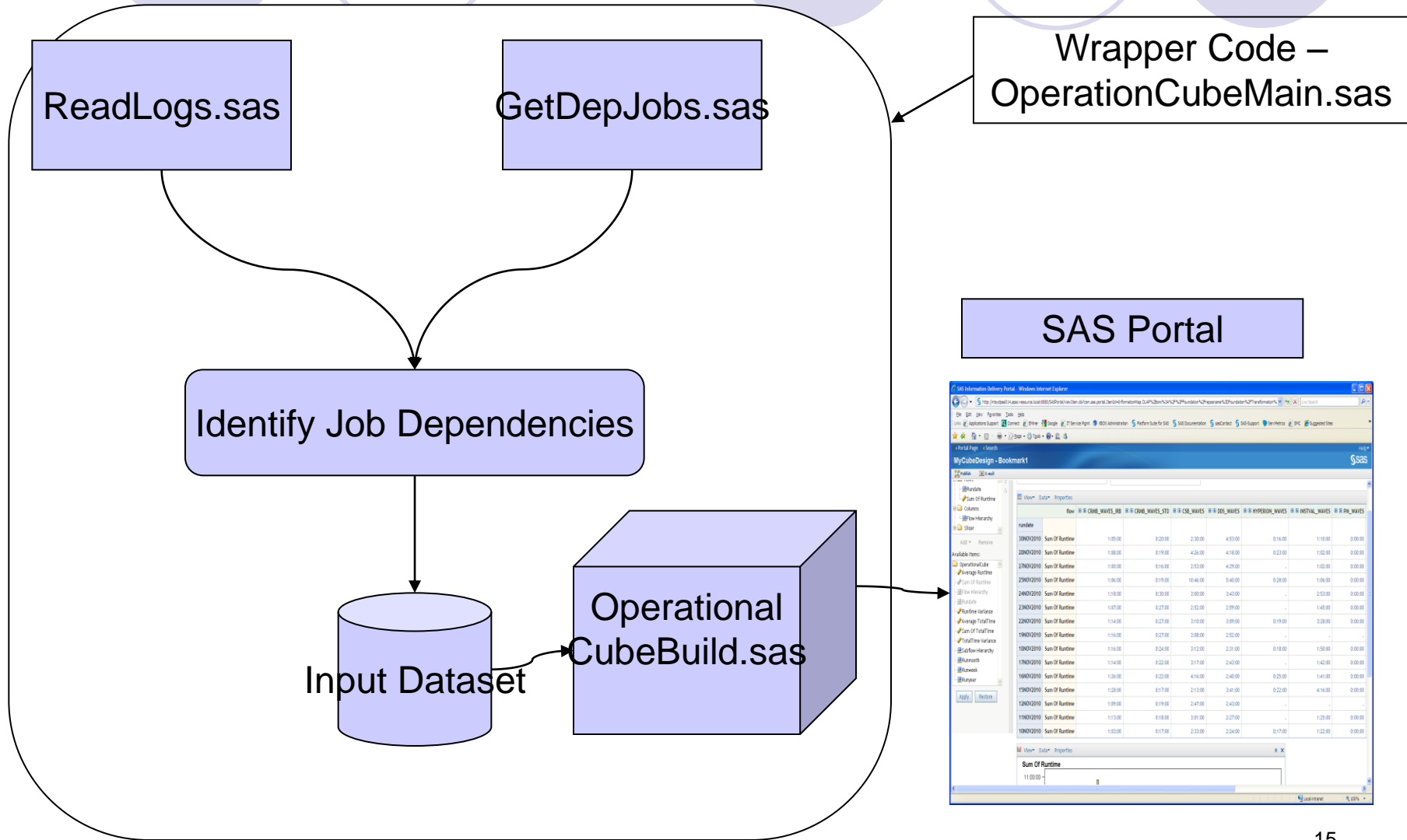
- **Technology – SAS v9.2**

- Base SAS code – extract information from SAS logs directory
- SAS 9.2 Language Interfaces to Metadata
- SAS OLAP Cube Studio – to build the cube
- SAS Information Delivery Portal – to display the cube

- **No extra licence required**

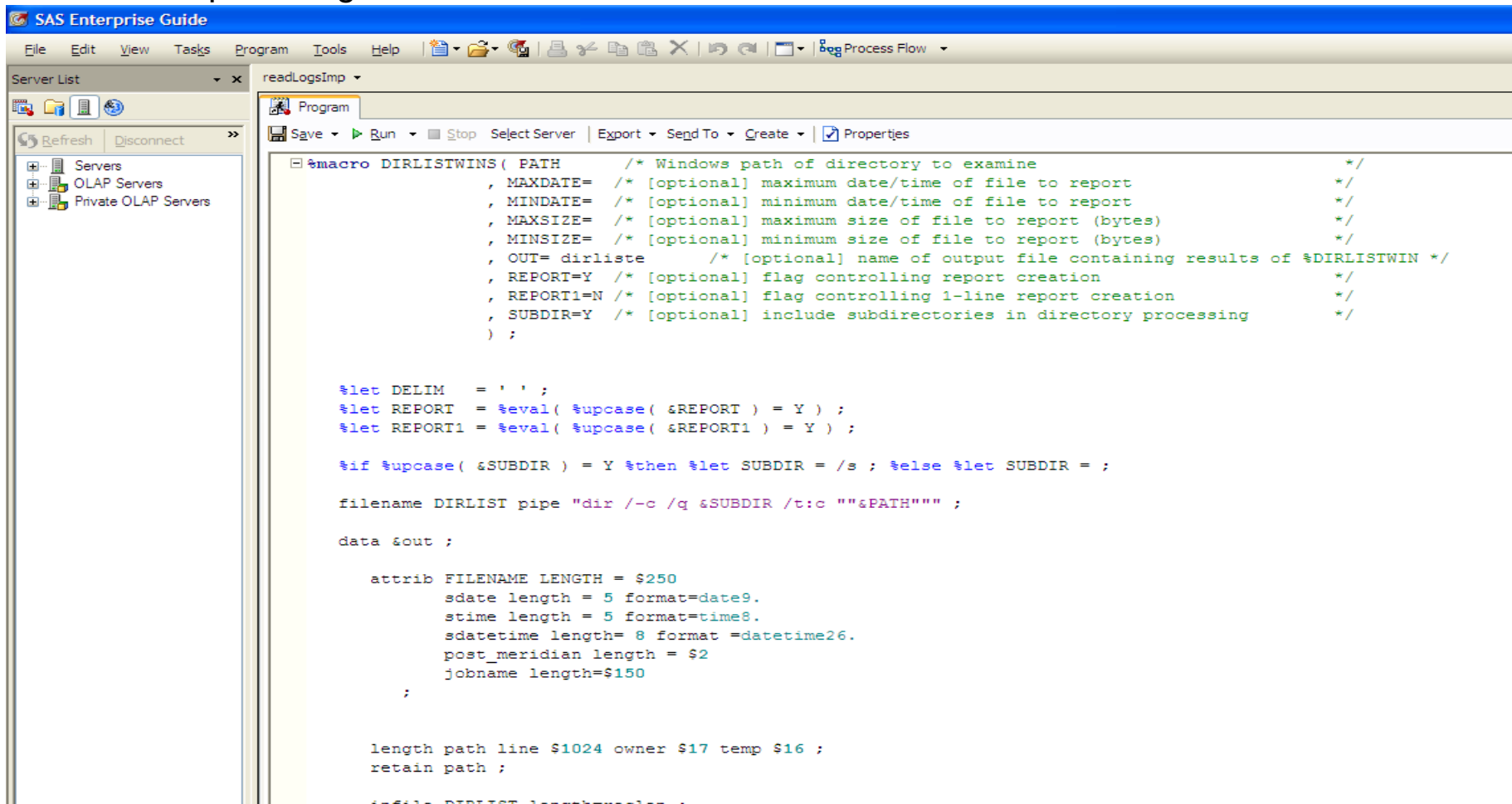
- **Effort – 3 days**

Data Flow into the cube



● readLogs.sas

- Used the DIRLIST macro -- <http://support.sas.com/kb/24/820.html>
- Gets directory information and gives file creation and written time and date
filename DIRLIST pipe "dir /-c /q &SUBDIR /t:w ""&PATH"" ;
filename DIRLIST pipe "dir /-c /q &SUBDIR /t:c ""&PATH"" ;
- Loops through sub directories



The screenshot displays the SAS Enterprise Guide interface. The main window shows a SAS program named 'readLogsImp'. The code defines a macro 'DIRLISTWINS' for directory listing with various options like MAXDATE, MINDATE, MAXSIZE, MINSIZE, OUT, REPORT, REPORT1, and SUBDIR. It then sets variables for DELIM, REPORT, and REPORT1, and uses a conditional statement to set SUBDIR based on the SUBDIR option. The code uses the DIRLIST macro to list files and pipes the output to a data set named 'out'. The data set is formatted with specific lengths and formats for various fields.

```
macro DIRLISTWINS( PATH /* Windows path of directory to examine */
, MAXDATE= /* [optional] maximum date/time of file to report */
, MINDATE= /* [optional] minimum date/time of file to report */
, MAXSIZE= /* [optional] maximum size of file to report (bytes) */
, MINSIZE= /* [optional] minimum size of file to report (bytes) */
, OUT= dirliste /* [optional] name of output file containing results of %DIRLISTWIN */
, REPORT=Y /* [optional] flag controlling report creation */
, REPORT1=N /* [optional] flag controlling 1-line report creation */
, SUBDIR=Y /* [optional] include subdirectories in directory processing */
) ;

let DELIM = ' ' ;
let REPORT = %eval( %upcase( &REPORT ) = Y ) ;
let REPORT1 = %eval( %upcase( &REPORT1 ) = Y ) ;

if %upcase( &SUBDIR ) = Y then let SUBDIR = /s ; else let SUBDIR = ;

filename DIRLIST pipe "dir /-c /q &SUBDIR /t:c ""&PATH"" ;

data &out ;

  attrib FILENAME LENGTH = $250
         sdate length = 5 format=date9.
         stime length = 5 format=time8.
         sdatetime length= 8 format =datetime26.
         post_meridian length = $2
         jobname length=$150
         ;

  length path line $1024 owner $17 temp $16 ;
  retain path ;

  infile DIRLIST ;
```

dir /-c /q /t:w – listing below

```
Administrator: C:\Windows\system32\cmd.exe
11/02/2011 10:07 AM 71193 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.11_10.07.18.log
12/02/2011 09:21 PM 71180 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.12_09.21.16.log
14/02/2011 08:52 PM 71164 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.14_08.51.59.log
16/02/2011 02:53 PM 71180 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.16_02.53.16.log
17/02/2011 02:03 PM 71180 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.17_02.03.32.log
19/02/2011 08:55 PM 71180 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.19_08.55.17.log
20/02/2011 03:27 PM 71171 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.20_03.27.11.log
21/02/2011 02:04 PM 71164 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.21_02.03.53.log
23/02/2011 06:23 AM 71164 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.23_06.23.02.log
24/02/2011 02:57 AM 71164 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.24_02.57.21.log
24/02/2011 07:14 AM 71181 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.24_07.14.37.log
24/02/2011 07:30 PM 71180 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.24_07.30.39.log
25/02/2011 05:32 PM 71165 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.25_05.31.52.log
27/02/2011 12:04 AM 71192 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.27_12.03.48.log
28/02/2011 04:27 AM 71181 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.02.28_04.27.04.log
02/03/2011 07:30 AM 71047 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.03.02_07.29.56.log
03/03/2011 01:47 PM 71027 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.03.03_01.47.23.log
04/03/2011 02:29 PM 71056 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.03.04_02.28.57.log
05/03/2011 01:04 PM 71043 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.03.05_01.04.29.log
06/03/2011 07:22 PM 71103 BUILTIN\Administrators CRMB_WAVES_IRB_CRMFB_Set_IRB_Approach_2011.03.06_07.22.16.log
04/02/2011 06:28 PM 11007 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.04_06.28.05.log
04/02/2011 12:01 AM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.04_12.01.34.log
06/02/2011 06:43 AM 11007 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.06_06.43.17.log
07/02/2011 01:59 AM 11007 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.07_01.59.31.log
09/02/2011 11:30 AM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.09_11.30.46.log
10/02/2011 10:03 AM 11011 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.10_10.03.23.log
11/02/2011 10:43 AM 11011 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.11_10.43.30.log
12/02/2011 09:57 PM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.12_09.57.58.log
14/02/2011 09:30 PM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.14_09.30.00.log
16/02/2011 03:31 PM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.16_03.31.13.log
17/02/2011 02:43 PM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.17_02.43.08.log
19/02/2011 09:30 PM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.19_09.30.50.log
20/02/2011 04:24 PM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.20_04.24.15.log
21/02/2011 02:40 PM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.21_02.40.21.log
23/02/2011 06:56 AM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.23_06.55.59.log
24/02/2011 08:08 PM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.24_08.08.55.log
25/02/2011 06:11 PM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.25_06.11.04.log
27/02/2011 12:37 AM 11011 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.27_12.37.43.log
28/02/2011 05:01 AM 11009 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.02.28_05.01.21.log
02/03/2011 08:11 AM 11007 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.03.02_08.11.12.log
03/03/2011 02:25 PM 11007 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.03.03_02.25.31.log
04/03/2011 03:05 PM 11007 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.03.04_03.05.34.log
05/03/2011 01:29 PM 11007 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.03.05_01.29.36.log
06/03/2011 08:39 PM 11007 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVES_2011.03.06_08.39.57.log
03/02/2011 09:42 PM 11103 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVE_01_2011.02.03_09.42.42.log
04/02/2011 03:52 PM 11103 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVE_01_2011.02.04_03.52.53.log
06/02/2011 03:51 AM 11103 BUILTIN\Administrators CRMB_WAVES_IRB_END_CRMFB_WAVE_01_2011.02.06_03.51.21.log
-- More --
```

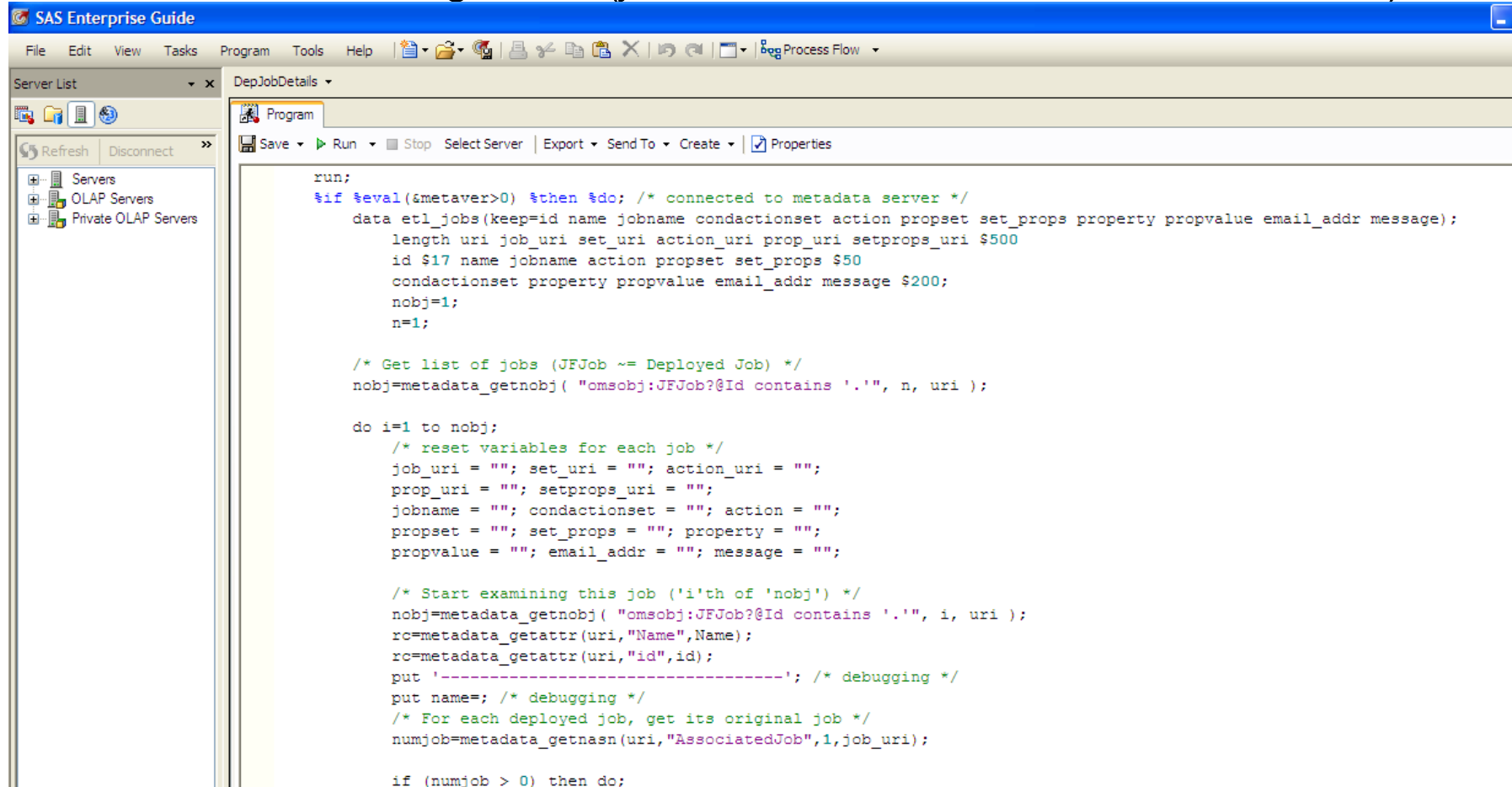


readLogs.sas

- Gets the job name
- Gets start time and end time of a job
- Calculates runtime of the job
- Calculates the end to end time
- Establishes a run date for a days run

GetDepJobs.sas

- SAS 9.2 Language Interfaces to Metadata
- Gives us all the deployed jobs by interrogating the metadata
- nobj=metadata_getnobj("omsobj:JFJob?@Id contains '.'", n, uri);
- numset=metadata_getnasn(job_uri,"ConditionActionSets",1,set_uri);



The screenshot shows the SAS Enterprise Guide interface. The title bar reads "SAS Enterprise Guide". The menu bar includes "File", "Edit", "View", "Tasks", "Program", "Tools", "Help", and a "beg Process Flow" dropdown. The "Server List" pane on the left shows a tree view with "Servers", "OLAP Servers", and "Private OLAP Servers". The main window is titled "DepJobDetails" and contains a "Program" editor with the following SAS code:

```
run;
  %if %eval(&metaver>0) %then %do; /* connected to metadata server */
    data etl_jobs(keep=id name jobname condactionset action_uri propset set_props property propvalue email_addr message);
      length uri job_uri set_uri action_uri prop_uri setprops_uri $500;
      id $17 name jobname action propset set_props $50;
      condactionset property propvalue email_addr message $200;
      nobj=1;
      n=1;

      /* Get list of jobs (JFJob ~= Deployed Job) */
      nobj=metadata_getnobj( "omsobj:JFJob?@Id contains '.'", n, uri );

      do i=1 to nobj;
        /* reset variables for each job */
        job_uri = ""; set_uri = ""; action_uri = "";
        prop_uri = ""; setprops_uri = "";
        jobname = ""; condactionset = ""; action = "";
        propset = ""; set_props = ""; property = "";
        propvalue = ""; email_addr = ""; message = "";

        /* Start examining this job ('i'th of 'nobj') */
        nobj=metadata_getnobj( "omsobj:JFJob?@Id contains '.'", i, uri );
        rc=metadata_getattr(uri,"Name",Name);
        rc=metadata_getattr(uri,"id",id);
        put '-----'; /* debugging */
        put name=; /* debugging */
        /* For each deployed job, get its original job */
        numjob=metadata_getnasn(uri,"AssociatedJob",1,job_uri);

        if (numjob > 0) then do;
```

Output table

SAS Enterprise Guide

File Edit View Tasks Program Tools Help | Process Flow

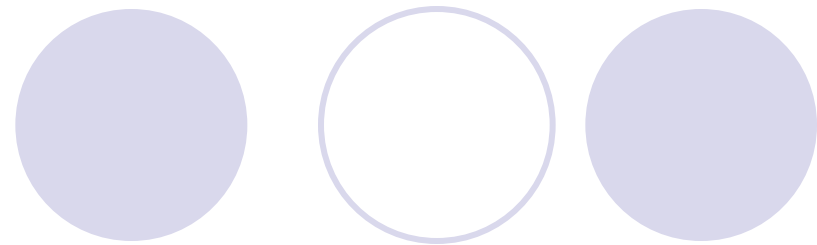
Server List Filter and Sort

Input Data Code Log Output Data

Modify Task Filter and Sort Query Builder Data Describe Graph Analyze Export Send To

| | runweek | rundate | runtime | etime | flow | dep_job | sdate | stime | edate | etime |
|-----|-----------|-----------|---------|---------|-------------|--------------|-----------|----------|-----------|----------|
| 69 | 11DEC2010 | 05DEC2010 | 0:06:00 | 3:30:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:00:59 | 05DEC2010 | 16:06:59 |
| 70 | 11DEC2010 | 05DEC2010 | 0:06:00 | 3:36:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:00:59 | 05DEC2010 | 16:06:59 |
| 71 | 11DEC2010 | 05DEC2010 | 0:05:00 | 3:41:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:02:59 | 05DEC2010 | 16:07:59 |
| 72 | 11DEC2010 | 05DEC2010 | 0:04:00 | 3:45:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:08:59 | 05DEC2010 | 16:12:59 |
| 73 | 11DEC2010 | 05DEC2010 | 0:00:00 | 3:45:00 | DDS_WAVES | DDS_WAVES_S_ | 05DEC2010 | 16:12:59 | 05DEC2010 | 16:12:59 |
| 74 | 11DEC2010 | 05DEC2010 | 0:00:00 | 3:45:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:13:59 | 05DEC2010 | 16:13:59 |
| 75 | 11DEC2010 | 05DEC2010 | 0:01:00 | 3:46:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:13:59 | 05DEC2010 | 16:14:59 |
| 76 | 11DEC2010 | 05DEC2010 | 0:07:00 | 3:53:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:13:59 | 05DEC2010 | 16:20:59 |
| 77 | 11DEC2010 | 05DEC2010 | 0:08:00 | 4:01:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:13:59 | 05DEC2010 | 16:21:59 |
| 78 | 11DEC2010 | 05DEC2010 | 2:38:00 | 6:39:00 | DDS_WAVES | DDS_WAVES_M_ | 05DEC2010 | 16:14:59 | 05DEC2010 | 18:52:59 |
| 79 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:39:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:14:59 | 05DEC2010 | 16:14:59 |
| 80 | 11DEC2010 | 05DEC2010 | 0:01:00 | 6:40:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:14:59 | 05DEC2010 | 16:15:59 |
| 81 | 11DEC2010 | 05DEC2010 | 0:01:00 | 6:41:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:15:59 | 05DEC2010 | 16:16:59 |
| 82 | 11DEC2010 | 05DEC2010 | 0:04:00 | 6:45:00 | DDS_WAVES | DDS_WAVES_L_ | 05DEC2010 | 16:20:59 | 05DEC2010 | 16:24:59 |
| 83 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:45:00 | DDS_WAVES | DDS_WAVES_E_ | 05DEC2010 | 18:52:59 | 05DEC2010 | 18:52:59 |
| 84 | 11DEC2010 | 05DEC2010 | 0:08:00 | 6:53:00 | DDS_WAVES | DDS_WAVES_C_ | 05DEC2010 | 18:53:59 | 05DEC2010 | 19:01:59 |
| 85 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | DDS_WAVES | DDS_WAVES_P_ | 05DEC2010 | 19:01:59 | 05DEC2010 | 19:01:59 |
| 86 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | DDS_WAVES | DDS_WAVES_E_ | 05DEC2010 | 19:01:59 | 05DEC2010 | 19:01:59 |
| 87 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:02:59 | 05DEC2010 | 19:02:59 |
| 88 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:02:59 | 05DEC2010 | 19:02:59 |
| 89 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:02:59 | 05DEC2010 | 19:02:59 |
| 90 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:02:59 | 05DEC2010 | 19:02:59 |
| 91 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:02:59 | 05DEC2010 | 19:02:59 |
| 92 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 93 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 94 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 95 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 96 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 97 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 98 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 99 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 100 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 101 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 102 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:03:59 | 05DEC2010 | 19:03:59 |
| 103 | 11DEC2010 | 05DEC2010 | 0:00:00 | 6:53:00 | CRMB_WAVES_ | CRMB_WAVES_ | 05DEC2010 | 19:04:59 | 05DEC2010 | 19:04:59 |

● Cube Build



Cube Designer

Cube Designer - General

Provide information about the cube that you want to create, and specify where the cube and its metadata will be stored.

Name:

Description:

OLAP schema:

Location:

Physical cube path:

Work path (optional):

Input Type

Cube will use aggregated data from other tables

Include secured member values in presummarized computations

< Back

Cube Designer

Cube Designer - Dimensions

Define dimensions, hierarchies and levels for the cube.

Dimensions:

Allow new members during incremental update:

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Dimension Designer

Dimension Designer - Level
Click Add to define new levels. Select values to set attributes at each level in the "RUNDATE_DIM" dimension.

Levels:

| # | Level | Input Column | Format | Caption | Type | |
|---|----------|--------------|--------|----------|--------|----------------|
| 1 | rundate | rundate | DATE9. | rundate | DAYS | Inherit: < Des |
| 2 | runmonth | runmonth | DATE9. | runmonth | MONTHS | Inherit: < Des |
| 3 | runweek | runweek | DATE9. | runweek | WEEKS | Inherit: < Des |
| 4 | runyear | runyear | DATE9. | runyear | YEAR | Inherit: < Des |

Rundate Dimension

Flow Dimension

Dimension Designer

Dimension Designer - Level
Click Add to define new levels. Select values to set attributes at each level in the "FLOW_DIM" dimension.

Levels:

| # | Level | Input Column | Format | Caption | Type | |
|---|-----------|--------------|--------|-----------|----------|----------------|
| 1 | flow | flow | (none) | flow | STANDARD | Inherit: < Asc |
| 3 | sub_flow1 | sub_flow1 | (none) | sub_flow1 | STANDARD | Inherit: < Asc |
| 4 | sub_flow2 | sub_flow2 | (none) | sub_flow2 | STANDARD | Inherit: < Asc |
| 2 | dep_job | dep_job | (none) | dep_job | STANDARD | Inherit: < Asc |

↑ ↓

Add Duplicate Delete

● Cube Build –used the code generated for scheduling

Cube Designer - Select Measures
Select the column and statistics that you want to define as measures. Optionally, click Define to add or remove unique member count measures.

Available:

- TimeinS
- edate
- etetime
- etime
- job_rk
- rundate
- runmonth
- runtime
- runweek
- runyear
- sdate
- stime

Selected:

- TimeinS
 - Variance
 - Average
 - Sum
- runtime
 - Average
 - Variance
 - Sum
- etetime
 - Variance
 - Maximum

Unique member count measures:

Define...

< Back Next > Cancel Help

Cube Designer
Review the cube definition and click Finish to save the metadata and create the cube.

```
OPTIONS VALIDVARNAME=ANY;  
  
libname SASDATA list;  
  
PROC OLAP  
  CUBE           = "/Shared Data/SASDiscovery - OLAP  
Schema/OperationalCube"  
  DATA          = SASDATA.COMPLETESUM  
  DRILLTHROUGH_TABLE = SASDATA.COMPLETESUM  
  PATH           = 'G:\SASWork\  
DESCRIPTION     = 'OperationalCube'  
;  
  
METASVR  
  HOST          = "NTSYDPAS013"  
  PORT          = 8561  
  OLAP_SCHEMA  = "SASDiscovery - OLAP Schema";
```

Delete the existing cube, save the metadata, and re-create the cube.
 Delete the existing cube, save the metadata, but do not re-create the cube.

Export Code...

< Back Finish Cancel Help

Output – SAS Portal

SAS Information Delivery Portal - Windows Internet Explorer

http://ntsypas014.apac-resource.local:8080/SASPortal/viewItem.do?com.sas.portal.ItemId=InformationMap.OLAP%2Bomi%3A%2F%2FFoundation%2Freposname%3DFound Live Search

File Edit View Favorites Tools Help

Links Applications Support Connect EMiner Google IT Service Mgmt KBOX Administration Platform Suite for SAS SAS Documentation sasContact SAS-Support ServMetrics SMC

Portal Page Search

MyCubeDesign - Bookmark1

Publish E-mail

View Data Properties

| | flow | DDS_WAVES | CRMB_WAVES_STD | CSB_WAVES | CRMB_WAVES_IRB | INSTVAL_WAVES | PM_WAVES |
|----------------|----------------|-----------|----------------|-----------|----------------|---------------|----------|
| rundate | | | | | | | |
| 10FEB2011 | Sum Of Runtime | 5:13:00 | 1:22:00 | 5:11:00 | 2:05:00 | 3:01:00 | 0:00:00 |
| 09FEB2011 | Sum Of Runtime | 5:09:00 | 1:18:00 | 4:40:00 | 2:06:00 | 2:50:00 | 0:00:00 |
| 08FEB2011 | Sum Of Runtime | 5:12:00 | 1:17:00 | 4:38:00 | 2:13:00 | 3:10:00 | 0:00:00 |
| 06FEB2011 | Sum Of Runtime | 6:26:00 | 1:21:00 | 4:06:00 | 2:02:00 | 2:43:00 | 0:00:00 |
| 05FEB2011 | Sum Of Runtime | 4:54:00 | 1:12:00 | 3:59:00 | 2:43:00 | 4:07:00 | 0:00:00 |
| 04FEB2011 | Sum Of Runtime | 5:58:00 | 1:16:00 | 4:54:00 | 2:23:00 | 3:33:00 | 0:00:00 |
| 02FEB2011 | Sum Of Runtime | 5:06:00 | 1:11:00 | 18:02:00 | 2:04:00 | 2:37:00 | 0:00:00 |
| 01FEB2011 | Sum Of Runtime | 4:15:00 | 1:11:00 | 7:53:00 | 2:01:00 | 2:49:00 | 0:00:00 |
| 31JAN2011 | Sum Of Runtime | 9:53:00 | 1:34:00 | 11:40:00 | 1:55:00 | 2:33:00 | 0:00:00 |
| 29JAN2011 | Sum Of Runtime | 18:11:00 | 1:06:00 | 9:04:00 | 1:49:00 | 2:27:00 | 0:00:00 |
| 26JAN2011 | Sum Of Runtime | 11:34:00 | 1:09:00 | 7:40:00 | 1:52:00 | 2:33:00 | 0:00:00 |
| 25JAN2011 | Sum Of Runtime | 6:25:00 | 1:04:00 | 14:01:00 | 1:48:00 | 2:19:00 | 0:00:00 |
| 23JAN2011 | Sum Of Runtime | 11:43:00 | 1:02:00 | 7:22:00 | 2:02:00 | 2:32:00 | 0:00:00 |
| 21 JAN2011 | Sum Of Runtime | 13:05:00 | 1:21:00 | 9:39:00 | 1:43:00 | 2:25:00 | 0:00:00 |

OperationalCube
Average Runtime
Sum Of Runtime
Flow Hierarchy
Rundate
Runtime Variance
Average TotalTime
Sum Of TotalTime
TotalTime Variance
Subflow Hierarchy
Runmonth
Runweek
Runyear

Apply Restore

Local intranet

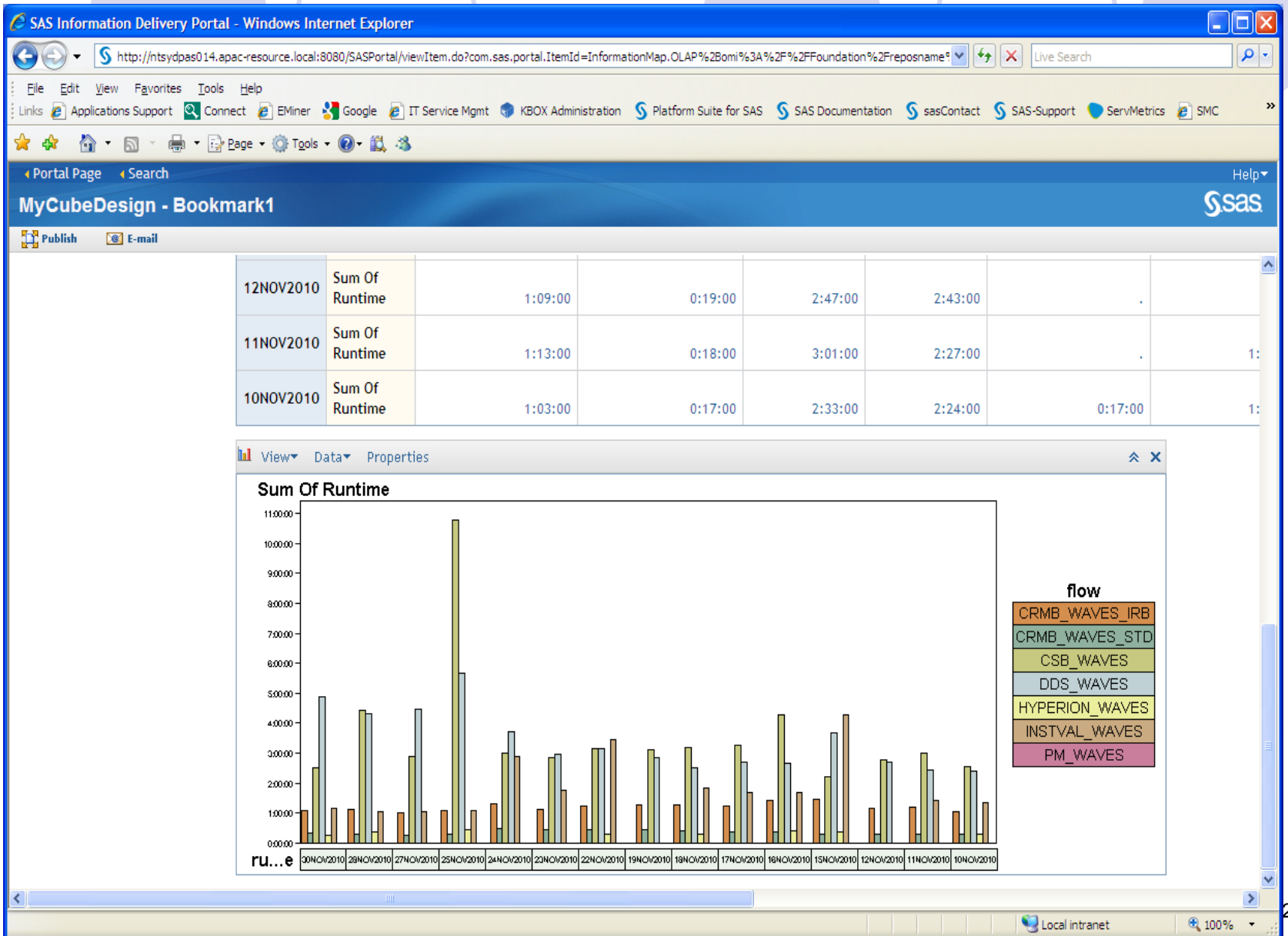
Operational Cube

- Advantages of a Cube
 - Filter data
 - Isolate the flow to investigate
 - Drill Down to individual job
 - Apply different metrics

The screenshot displays the SAS Information Delivery Portal in a Windows Internet Explorer browser. The page title is "MyCubeDesign - Bookmark1". The interface includes a "Publish" button and an "E-mail" icon. The main content area is divided into two panes. The left pane shows a tree view of the cube design with folders for "Columns" and "Slicer". Under "Columns", there are "Rundate" and "Sum Of Runtime". Under "Slicer", there is "Sum Of Runtime". Below this, there are "Add" and "Remove" buttons. The right pane shows a table with columns "View", "Data", and "Properties". The table has a header row with "rundate" and "31JAN2011". Below the header, there is a row for "Sum Of Runtime". The table lists various jobs and their runtime durations. At the bottom of the table, there is a "Total" row with a runtime of "11:40:00".

| | rundate | 31JAN2011 |
|-----------------------------------|---------|-----------------|
| | | Sum Of Runtime |
| dep_job | | |
| CSB_WAVES_CheckBuildScoringABT | | 1:56:00 |
| CSB_WAVES_END_CSB_WAVES | | 0:00:00 |
| CSB_WAVES_END_CSB_WAVE_01 | | 0:00:00 |
| CSB_WAVES_MasterLoopStarSchemaJob | | 9:44:00 |
| CSB_WAVES_START_CSB_WAVES | | 0:00:00 |
| CSB_WAVES_START_CSB_WAVE_01 | | 0:00:00 |
| CSB_WAVES_UPDATE_FLOW_CONTROL | | 0:00:00 |
| Total | | 11:40:00 |

Output – showing the trend



Operational Cube



- Operational team can now check
 - Has the run completed
 - How long the run it taking
 - Drill down to identify long running jobs
 - Look at the runtime trends
- Next steps
 - Get information of fullstimer logging(Real,Cpu,Memory) from the logs
 - Number of records added
 - Table Growth

Useful resources



- Dirlist Macro - <http://support.sas.com/kb/24/820.html>
- [SAS 9.2 Language Interfaces to Metadata](#) at SAS Techsupport Website
- Performance Tuning - www.sas.com/offices/asiapacific/sp/usergroups/smug/archive/2009/presentations/BillGibsonPerformanceQ22009.pdf