



# Fully Automated Workflow Infrastructure for Provision of Mission Data Products

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# Requirements and Objective for Offline-Processing

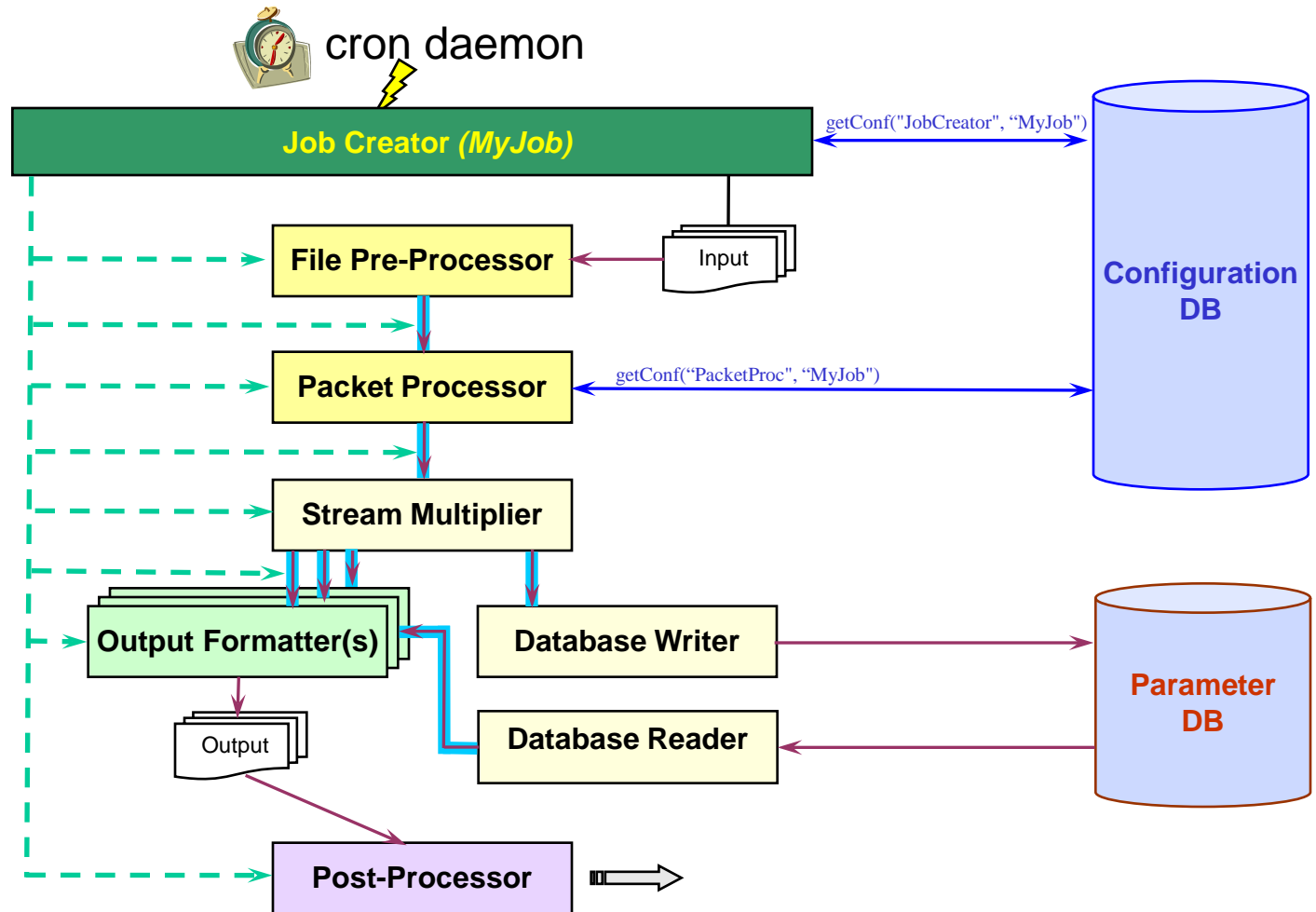
- Provide a functionality to create mission data products from groundstation dump data
- **Automatic:** do as much as possible without operator involvement
- **Efficient:** deliver mission data products rapidly
- **Data consolidation:** dump files from GS containing transfer frames and / or packets contain timely overlaps that need to be consolidated before translating them into final data products (conforming to PUS)
- **Completely database driven:** complete configuration is maintained in a database
- **Open framework:** uniform interfaces within OLP safeguard interchangeability of processor building block applications
- **Self-standing database of parameter data** for efficient further processing (archiving, retrieval, statistics, etc.)
- **Extensible:** data processors for future mission data products can be conveniently added



# Architecture of Offline-Processing

- **Job Creator:** orchestrates all processing steps (→following slide)
- **File Processors:** produce consolidated parameter data from dump files (also allow parallel processing of consolidated data)
- **Parameter Processors:** receive parameter data, generate data products
- **Post-Processors:** perform auxiliary actions on final data products (distribution, compression, re-insertion into further processing chain, etc.)

# Functional Overview



# MMI Prototype

**CRON Help**

The time and date fields are:

field	allowed values
minute	0-59
hour	0-23
day of month	0-31
month	0-12 (or names, see below)
day of week	0-7 (0 or 7 is Sun, or use names)

A field may be an asterisk (\*), which always stands for "first-last". Ranges of numbers are allowed. Ranges are two numbers separated with a hyphen. The specified range is inclusive. For example, 8-11 for an 'hours' entry specifies execution at hours 8, 9, 10 and 11.

Lists are allowed. A list is a set of numbers (or ranges) separated by commas. Examples: "1,2,5,9", "0-4,8-12".

Step values can be used in conjunction with ranges. Following a range with /<number> specifies skips of the number's value through the range. For example, "0-23/2" can be used in the hours field to specify command execution every other hour. Steps are also permitted after an asterisk, so if you want to say "every two hours", just use "\*/2".

Names can also be used for the 'month' and 'day of week' fields. Use the first three letters of the particular day or month (case doesn't matter). Ranges or lists of names are not allowed.

Note: The day of a command's execution can be specified by two fields - day of month and day of week. If both fields are restricted (ie, aren't \*), the command will be run when either field matches the current time.  
For example, "30 4 1,15 \* \* 5" would cause a command to be run at 4:30 am on the 1st and 15th of each month, plus every Friday.

CRON Schedule	Last Run	Duration	Status	Progress	Next Run	Additional Informations
5 7 * * 1-5	21.03 07:15	1:23.217	Success	-	22.03 07:15	Searched directories, file names and file masks may be displayed here E.g:
5 8 * * 1-5	21.03 08:15	0:01:111	Failure	-	22.03 08:15	/user/TSX/APID_1170;/user/TSX/APID_1170, *_1170_*.dat
0 15 * * *	21.03 15:00	-	Running	50%	22.03 15:00	Search at 15:00 every work week day (Mon. - Fri.)
1 19 * * 1-5	21.03 19:23	11:05.321	Aborted	10%	22.03 19:23	/user/TSX/VCI;/user/TSX/APID_1170, *_1170_*.dat, *_1170_*.dat
5 */2 * * *	-	-	-	-	-	Five Minutes after every even hour
*/7 * * 1-5	22.03 09:07	00:17.321	Success	-	22.03 12:07	Seven minutes after every third hour every work week day (Mon. - Fri.)
1-23/2 * * *	22.03 07:07	00:05.321	Success	-	22.03 09:07	Seven minutes after every odd hour
* */10 1-23/2 * * *	22.03 09:50	01:05.321	Success	-	22.03 10:00	Every ten minutes in every odd hour

Time	Task	Message
22.03.2007 05:15	Morning Search_1	This shall be an Info Message - It is detriable too early!
22.03.2007 09:15	Morning Search_2	This shall be a Warning Message - Better, but still too early
22.03.2007 10:15	Morning Search_1	This shall be an Error Message - Not for me! I go asleep
22.03.2007 11:20	Morning Search_2	This shall be an Info-Message - It do something!
22.03.2007 14:08	Morning Search_1	This shall be an Error Message - As you like, now its too late, the afternoon shall overtake
22.03.2007 14:12	Afternoon Search_1	This shall be an Info Message - Overtaking from Morning Search_1
22.03.2007 15:00	Manager	This shall be a Warning Message - Morning Search_1 you are freed!
22.03.2007 17:00	Morning Search_1	This shall be an Info Message - The tomorrow morning is your tour



# Performance Achieved

## Reference hardware

- Intel Dual-Core, 1.86GHz
- 2GB RAM
- 160GB SATA drive, 7200 rpm
- SUSE Linux SLES-10

## Performance figures

- using Packet Processor, Stream Multiplier, and Formatter:  
**62.000 parameters per second**
- Using Packet Processor and Database Writer:  
**40.000 parameters per second**

# Outlook

- Offline Processing is in operational usage for the TerraSAR-X and Tandem-X missions
- Parameter Database will receive interfaces to mission long-term databases
- Extensions for Parameter-Processors according to specific mission needs like
  - Statistics
  - long-term trend analysis
  - graphical data product generation





# Conclusion

- OLP is an efficient framework for supplying data products
- OLP offers high processing performance to supply mission decision makers with relevant information in minimum amount of time
- OLP creates routine reports in fully automated fashion
- OLP offers several degrees of freedom to support data product needs simply by configuration