Overview of nagg 1.4.0

Presentation and Demo for DEWG

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nagg 1.4.0 overview

Purpose of presentation and demo:

1. Introduce, demonstrate and encourage trying out the nagg tool.
2. Check correctness of assumptions made in building the tool and of its output.
3. Invite feedback for improvement.

nagg 1.4.0 overview

- What is nagg?
- Why would I use it?
- Where do I get it?
- What does nagg do?
- nagg command options
- nagg examples

What is nagg?

Nagg is a tool for rearranging NPP data granules from existing files to create new files with a different aggregation number or a different packaging arrangement.

Why would I use nagg?

- Change aggregation number or packaging of previously downloaded npp data.

- Create aggregation or package combination not available for download.

Where to get nagg

The latest information and source for nagg can be found at http://www.hdfgroup.org/projects/npoess/nagg_index.html.

A tar file containing these slides, example files and nagg 1.4.0 64bit executable is available at ftp://ftp.hdfgroup.uiuc.edu/pub/outgoing/JPSS/source/NAGG/nagg1.4_demo.tar.gz.

To build nagg:

- Download and extract the nagg-1.4.0.tar.gz file for 32 or 64 bit Linux.
- HDF5 and the hdf5_HL_REGION library are required. The hdf5_HL_REGION library source can also be downloaded from the links above.
- Build the source according to the doc/INSTALL file.

Definitions

- Nagg - NPP granule aggregation and packaging utility
- Granule - A grouping of measurement or derived data (and/or data arrays) spanning a defined period (e.g., 28.6 seconds) and integer number of sensor scans. Definition varies for sensors and EDRs. The granule(s) can be accessed through the HDF5 reference regions provided in the NPOESS HDF5 Files.

  A granule within HDF5 is typically delineated with individually named and typed data arrays; each array is referenced with a separate object ID. RDRs, and Auxiliary/Ancillary data products delivered as HDF5, are in contrast binary structures stored purely as an array of bytes (unsigned char) referenced with a single object ID.[1]
- Aggregation - A collection of granules, within an NPOESS HDF5 file. This will be a contiguous array for SDR/EDR/TDR/IP products. For RDR products, the aggregation's object ID dereferences (or "points") to an HDF5 group that contains one or more datasets. These datasets are the individual RDR granules. Granules are ordered temporally. The aggregation can be accessed with the HDF5 reference object. For a detailed explanation of aggregations, see Section 3.5.12, DDS Aggregation Methodology.[1]
- Package – Compatible NPP data products together or with corresponding geolocation product in common files.

[1] JPSS Common Data Format Control Book – External Volume I, p 76

Nagg operations

Aggregation

- Aggregate data granules
- De-aggregate data granules
- Re-aggregate data granules

Packaging

- Package granules of multiple compatible products in common files
- Un-package products into separate files for each product

Nagg options used in the examples

Aggregation

- -n *n* where n is the number of granules in each output aggregation
- -A <*seconds*> ➔ *n*
- Default value of *n* is 1

Packaging

- Default output is in packaged output files
- -S option produces simple unpackaged output files

General

- -d <*preexisting output directory*>
- -h or –help
- -t <*list of product ids*> (list is required)
- -g *no* - don't process geolocation product
- -g <*geolocation product*>

Nagg --h or --help

This option displays the list of available command options and a table of NPP product DPIDs, Short Names, Durations and GPIDs. The DPIDs and GPIDs are 5 letter ids used in the command option product lists and the output file names. There are currently 96 sensor data products and 19 geo-location products in the table, the first 7 shown here:

DPID	Short Name	Duration	GPID
----	----------	----------	-----
ICALI	CrIMSS-CrIS-AVMP-LOS-IR-IP	31997000	GCRIO
ICALM	CrIMSS-CrIS-AVMP-LOS-MW-IP	31997000	GCRIO
ICCCR	CrIMSS-CrIS-CLOUD-CLEARED-RAD-IP	31997000	GCRIO
ICISE	CrIMSS-CrIS-IR-SURF-EMISSIVITY-IP	31997000	GCRIO
ICMSE	CrIMSS-CrIS-MW-SURF-EMISSIVITY-IP	31997000	GCRIO
ICSTT	CrIMSS-CrIS-SKIN-TEMP-IP	31997000	GCRIO
ICTLI	CrIMSS-CrIS-AVTP-LOS-IR-IP	31997000	GCRIO

…

nagg examples

- Aggregation (packaged) with geolocation product
- Aggregation of geolocation product only
- De-aggregation (packaged) with geolocation product
- Re-aggregation without geolocation product
- Packaging of 2 sensor data products plus geolocation product
- De-aggregation and un-packaging of 2 sensor data products plus geolocation product

Nagg operations

Aggregation

- **Aggregate data granules**
- De-aggregate data granules
- Re-aggregate data granules

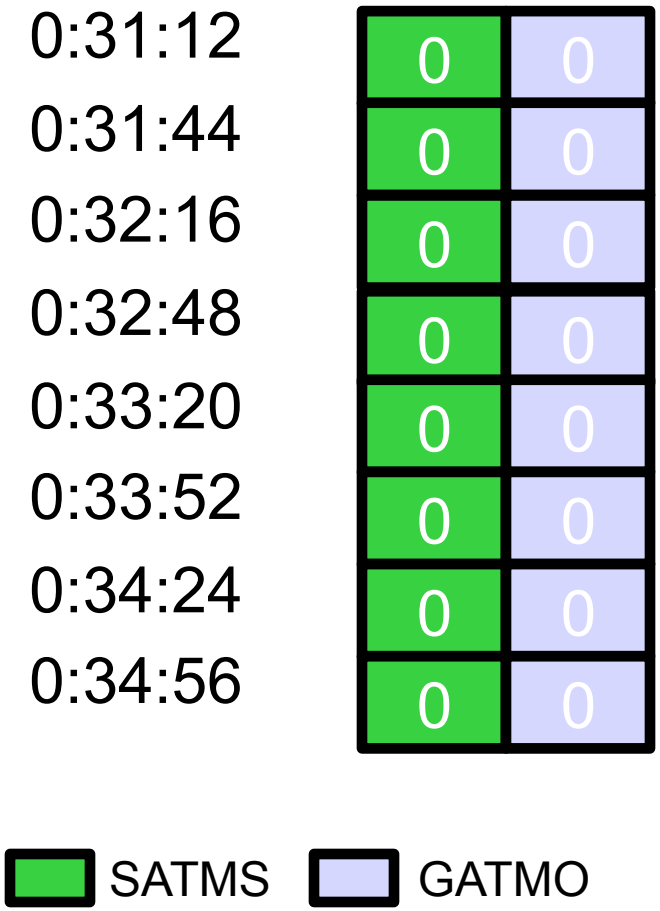
Packaging

- **Package granules of multiple compatible products in common files**
- Un-package products into separate files for each product

1 Aggregation (Packaged)

Increase number of granules per aggregation from 1 to 4

Input files (8 + 8 geo)



Geolocation product is processed automatically and packaged with sensor data product by default.

Command:

nagg –n 4 –t SATMS –d ex1 datafiles/SATMS*.h5

Input:

8 files with 1 granule in each file

Output:

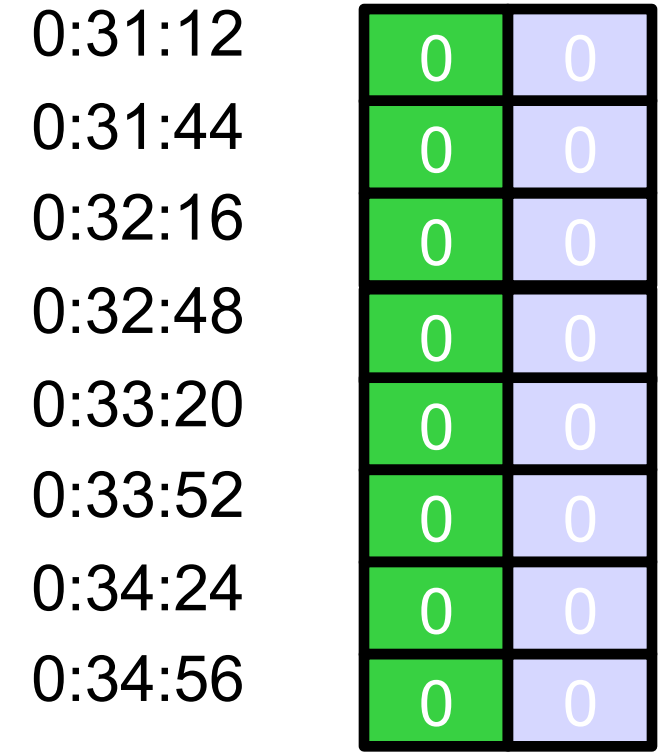
Produced 4 granules in ex1/GATMO-SATMS_npp_d20120404_t0031123_e0033199_b02251_c20120920193004057328_XXXX_XXX.h5

Produced 4 granules in ex1/GATMO-SATMS_npp_d20120404_t0033203_e0035279_b02251_c20120920193004110634_XXXX_XXX.h5

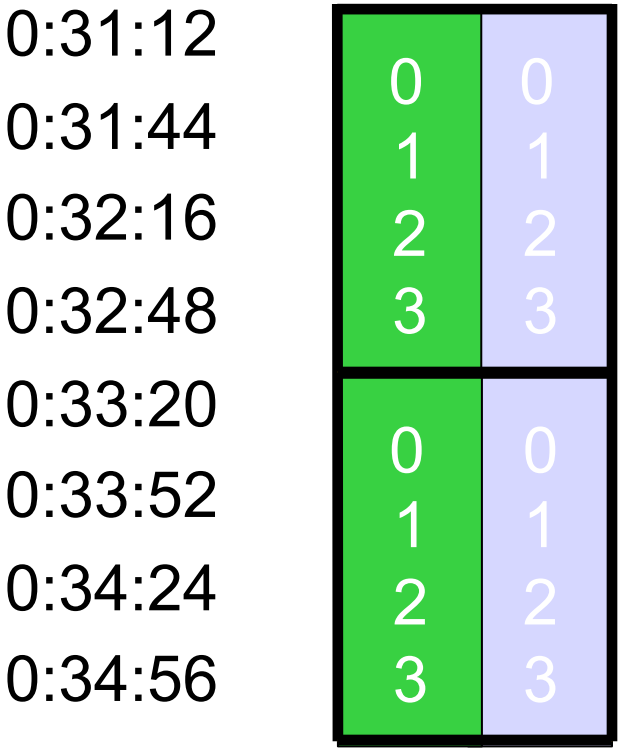
1 Aggregation (Packaged)

Increase number of granules per aggregation from 1 to 4

Input files (16)



Output files (2)



SATMS GATMO

Nagg operations

Aggregation

- **Aggregate data granules**
- De-aggregate data granules
- Re-aggregate data granules

Packaging

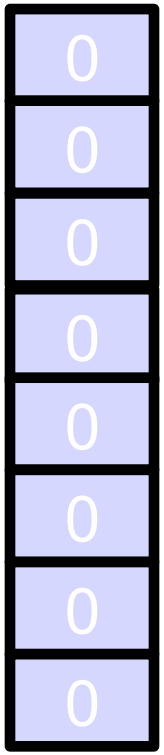
- Package granules of multiple compatible products in common files
- Un-package products into separate files for each product

2 Aggregation (GEO only)

Increase number of granules per aggregation from 1 to 4

Input files (8)

0:31:12
0:31:44
0:32:16
0:32:48
0:33:20
0:33:52
0:34:24
0:34:55



GATMO

Command:

nagg –n 4 –g GATMO –d ex2 datafiles/GATMO*.h5

Input:

8 files with 1 granule in each file

Output:

Produced 4 granules in ex2/ GATMO_npp_d20120404_t0031123_e0033199_b02251_c20120920221811878028_XXXX_XXX.h5

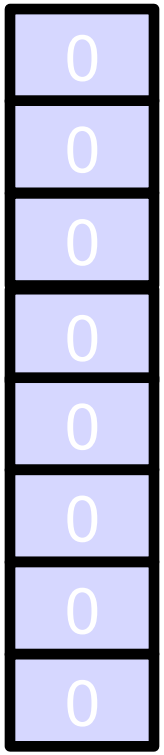
Produced 4 granules in ex2/ GATMO_npp_d20120404_t0033203_e0035279_b02251_c20120920221811896843_XXXX_XXX.h5

2 Aggregation (GEO Only)

Increase number of granules per aggregation from 1 to 4

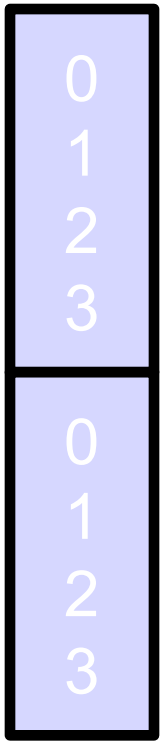
Input files (8)

0:31:12
0:31:44
0:32:16
0:32:48
0:33:20
0:33:52
0:34:24
0:34:55



Output files (2)

0:31:12
0:31:44
0:32:16
0:32:48
0:33:20
0:33:52
0:34:24
0:34:55



Nagg operations

Aggregation

- Aggregate data granules
- **De-aggregate data granules**
- Re-aggregate data granules

Packaging

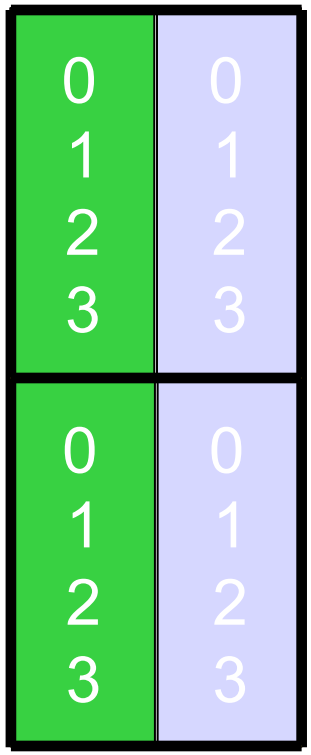
- **Package granules of multiple compatible products in common files**
- Un-package products into separate files for each product

3 De-aggregation (Packaged)

Decrease number of granules per aggregation from 4 to 1

Input files (2)

0:31:12
0:31:44
0:32:16
0:32:48
0:33:20
0:33:52
0:34:24
0:34:56



SATMS GATMO

Command:

nagg –t SATMS –d ex3 ex1/GATMO-SATMS_npp_d20120404*.h5

Output (8 files):

Produced 1 granules in ex3/GATMO-SATMS_npp_d20120404_t0031123_e0031439_b02251_c20120921034647251207_XXXX_XXX.h5

Produced 1 granules in ex3/GATMO-SATMS_npp_d20120404_t0031443_e0032159_b02251_c20120921034647269431_XXXX_XXX.h5

…

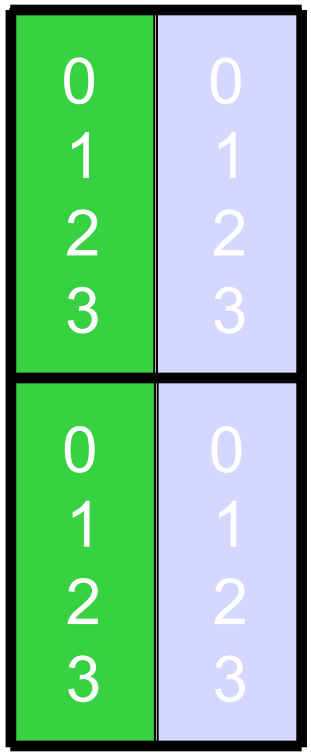
Produced 1 granules in ex3/GATMO-SATMS_npp_d20120404_t0034563_e0035279_b02251_c20120921034647374989_XXXX_XXX.h5

3 De-aggregation (Packaged)

Decrease number of granules per aggregation from 4 to 1

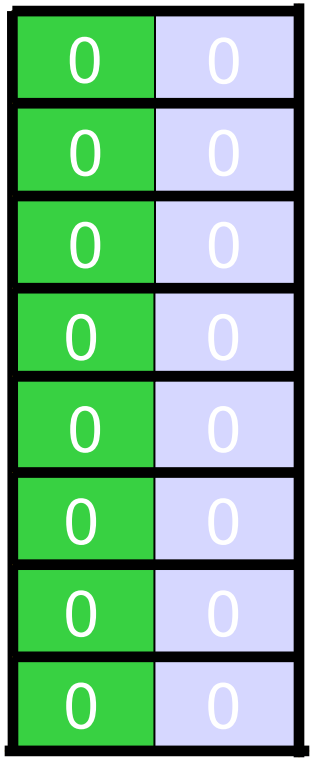
Input files (2)

0:31:12
0:31:44
0:32:16
0:32:48
0:33:20
0:33:52
0:34:24
0:34:56



Output files (8)

0:31:12
0:31:44
0:32:16
0:32:48
0:33:20
0:33:52
0:34:24
0:34:56



SATMS GATMO

Nagg operations

Aggregation

- Aggregate data granules
- De-aggregate data granules
- **Re-aggregate data granules**

Packaging

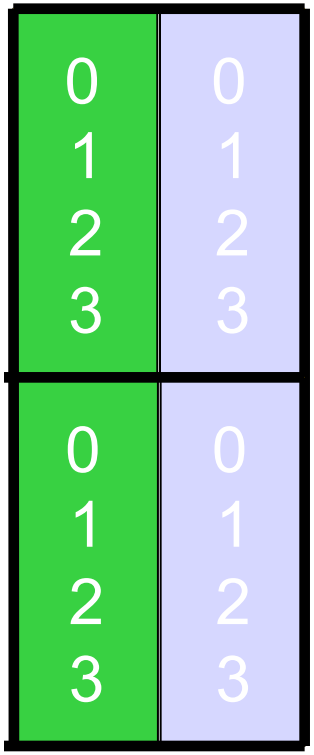
- Package granules of multiple compatible products in common files
- Un-package products into separate files for each product

4 Re-aggregation without geolocation

Decrease number of granules per aggregation from 4 to 3

Input files (2)

0:31:12
0:31:44
0:32:16
0:32:48
0:33:20
0:33:52
0:34:24
0:34:56



SATMS GATMO

-A 90 produces 3 - 32 second granules per aggregation for the SATMS and GATMO products

Command:

nagg –g no –A 90 –t SATMS –d ex4 ex1/GATMO-SATMS_npp_d20120404*.h5

Output:

Produced 3 granules in ex4/ SATMS_npp_d20120404_t0031123_e0032479_b02251_c20120921042244629970_XXXX_XXX.h5

Produced 3 granules in ex4/ SATMS_npp_d20120404_t0032483_e0034239_b02251_c20120921042244659487_XXXX_XXX.h5

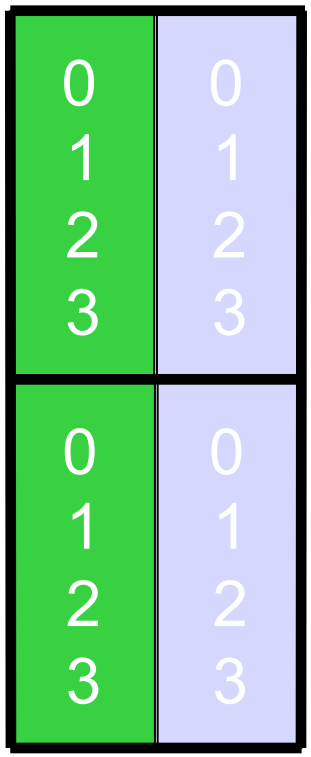
Produced 2 granules in ex4/ SATMS_npp_d20120404_t0034243_e0035279_b02251_c20120921042244692216_XXXX_XXX.h5

4 Re-aggregation without geolocation

Decrease number of granules per aggregation from 4 to 3

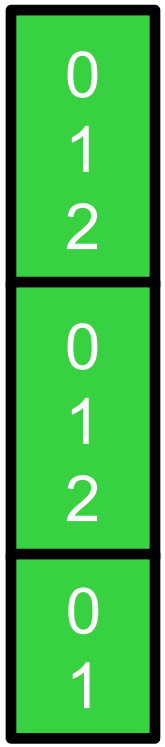
Input files (2)

0:31:12
0:31:44
0:32:16
0:32:48
0:33:20
0:33:52
0:34:24
0:34:56



Output files (2)

0:31:12
0:31:44
0:32:16
0:32:48
0:33:20
0:33:52
0:34:24
0:34:56



SATMS GATMO

Partial aggregations and buckets

- Buckets (aggregation boundaries) are predetermined by the aggregation number and the granule duration starting from the IET* EPOCH, 1/1/1958
- Nagg does not produce leading or trailing fill granules for partial aggregations at the beginning or end of a set of granules.
- For a more extensive explanation see section 3.5.12, p 129 of the JPSS Common Data Format Control Book – External Volume I

* IDPS Epoch Time

Nagg operations

Aggregation

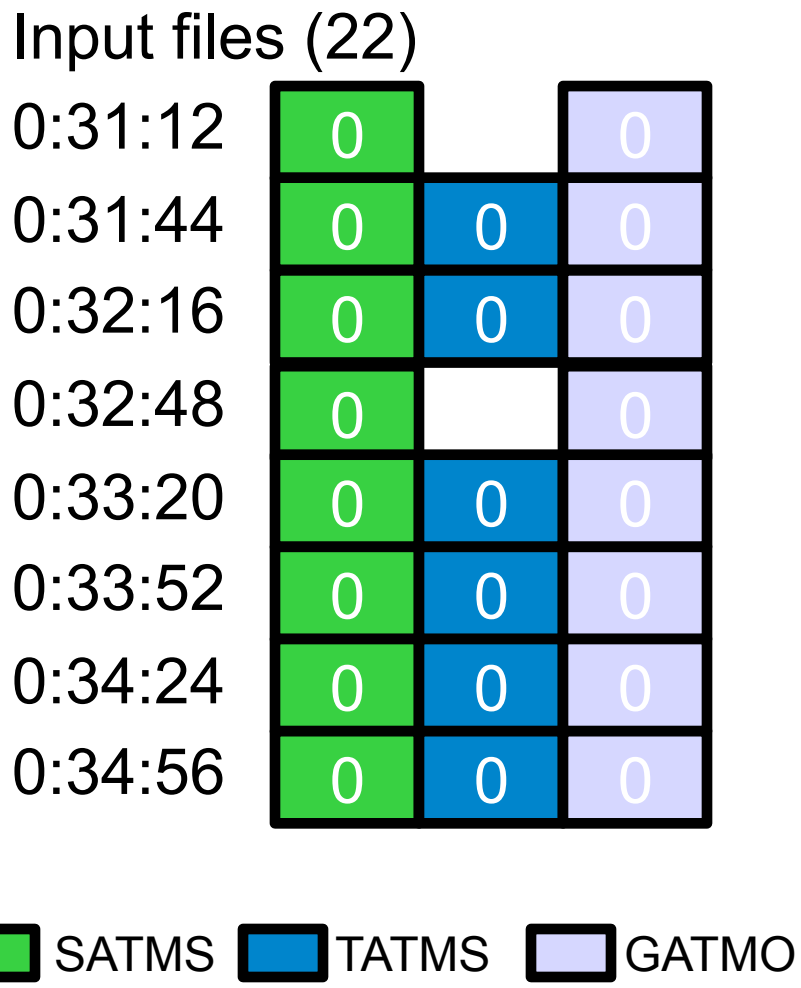
- Aggregate data granules
- De-aggregate data granules
- Re-aggregate data granules

Packaging

- **Package granules of multiple compatible products in common files**
- Un-package products into separate files for each product

5 Packaging

Package SATMS,TATMS,GATMO products



Fill granules will be created for missing granules from missing files.

Command:

nagg –t SATMS,TATMS –d ex5 datafiles/ SATMS*.h5 datafiles/TATMS*.h5

Output (8 files):

Produced 1 granules in ex5/GATMO-SATMS-TATMS_npp_d20120404_t0031123_e0031370_b02251_c20120921043859559810_XXXX_XXX.h5

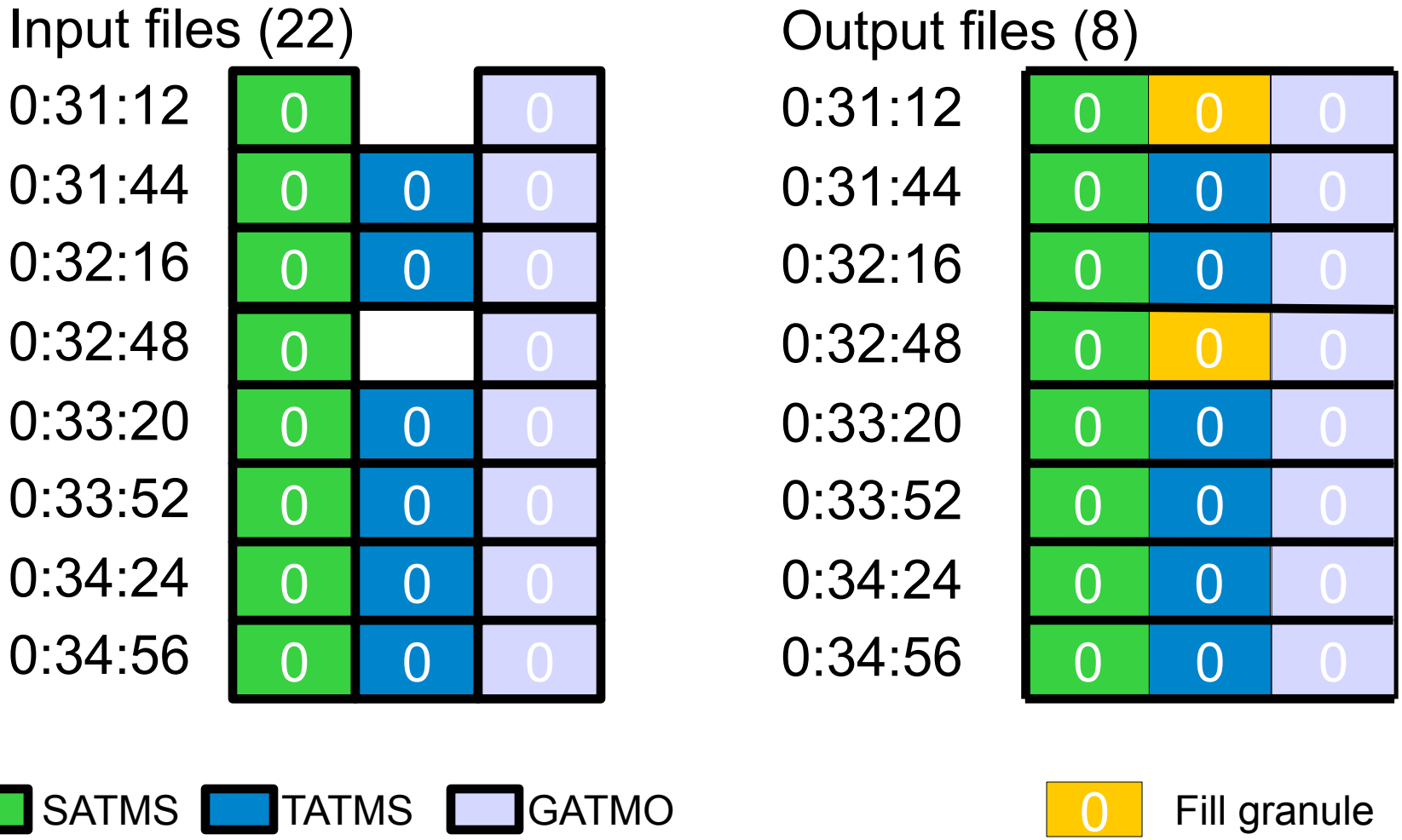
Produced 1 granules in ex5/GATMO-SATMS-TATMS_npp_d20120404_t0031443_e0032159_b02251_c20120921043859591107_XXXX_XXX.h5

…

Produced 1 granules in ex5/GATMO-SATMS-TATMS_npp_d20120404_t0034563_e0035279_b02251_c20120921043859765891_XXXX_XXX.h5

5 Packaging

Package SATMS,TATMS,GATMO products



Fill granules

- Are created when granules in a sequence are missing or when corresponding products do not have matching granules; however, files of entirely fill granules are not created.
- Have the same amount of data as regular granules, but all values are fill values as defined in control books or product profiles.
- Have the same structure and attributes as regular granules.
- Can be identified by the granule's N_Granule_Status attribute. Nagg creates fill granules with the value "Missing at delivery time". Regular granules have the value "N/A".

Nagg operations

Aggregation

- Aggregate data granules
- **De-aggregate data granules**
- Re-aggregate data granules

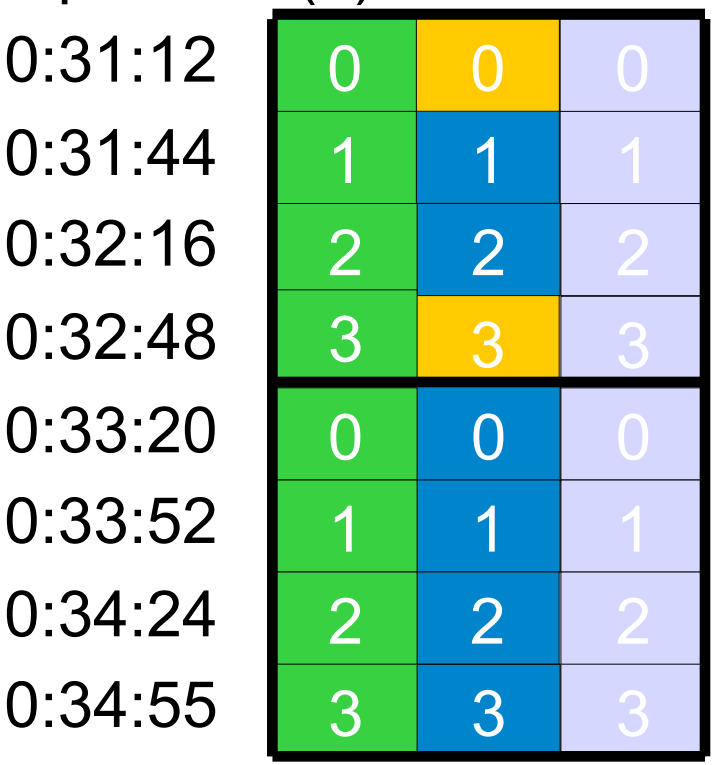
Packaging

- Package granules of multiple compatible products in common files
- **Un-package products into separate files for each product**

HDF6 De-aggregation and Un-packaging

De-aggregate and un-package SATMS,TATMS,GATMO products

Input files (2)



Command:

nagg -S –t SATMS,TATMS –d ex6 datafiles/ GATMO-SATMS-TATMS_npp_d20120404*.h5

Output (24 files):

Produced 1 granules in ex6/ SATMS_npp_d20120404_t0031123_e0031370_b02251_c20120921124159196355_XXXX_XXX.h5

Produced 1 granules in ex6/ TATMS_npp_d20120404_t0031123_e0031370_b02251_c20120921124159196355_XXXX_XXX.h5

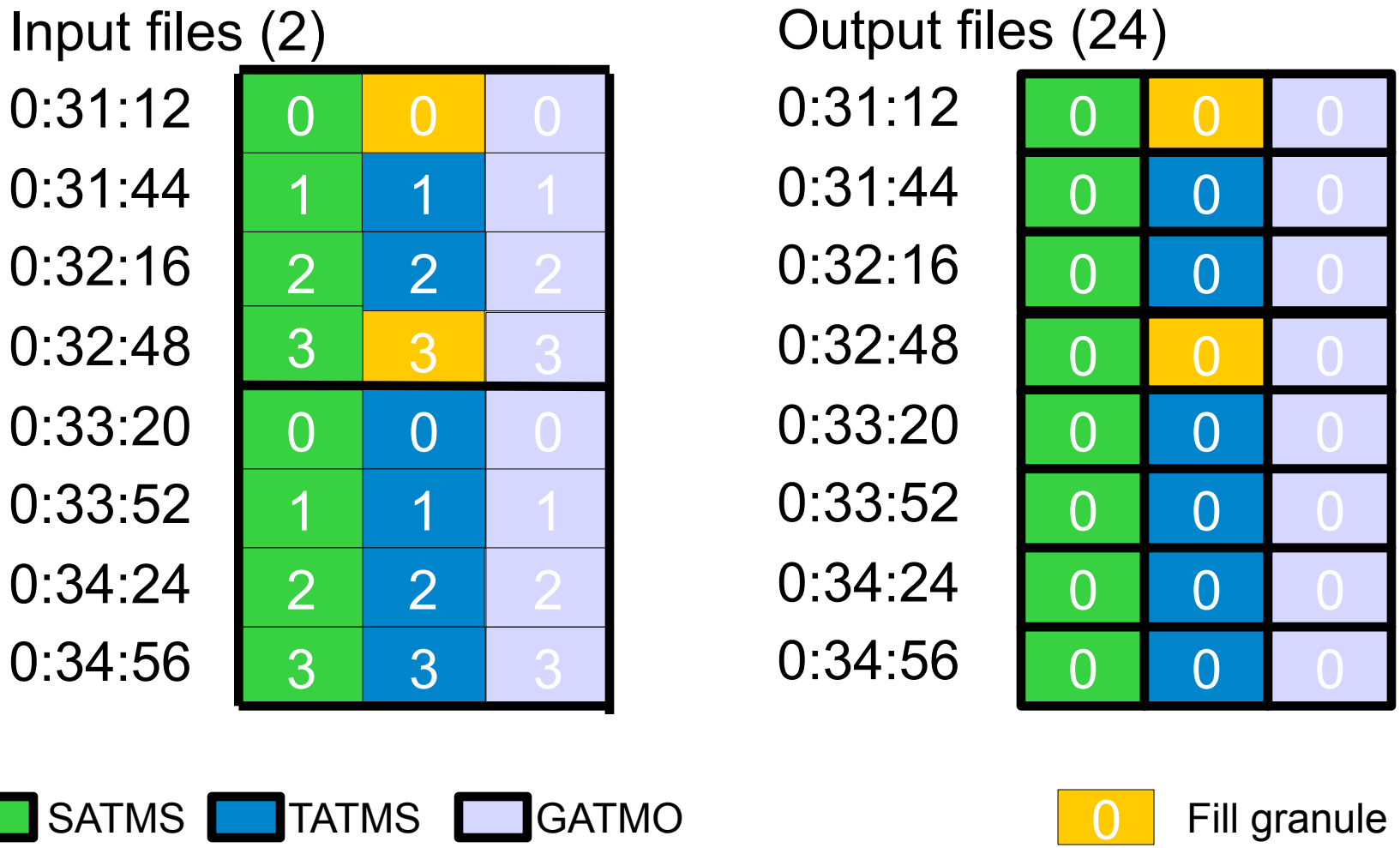
…

SATMS TATMS GATMO

0 Fill granule

HDF6 De-aggregation and Un-packaging

De-aggregate and un-package SATMS,TATMS,GATMO products



Other nagg options

- -l –like <*example file*>
  include products and use aggregation number as found in <*example file*>
- -g *strict* require exact match for geolocation files
- --version Print version information
- --debug Print all granules in input files, including those not selected by command options
- -O <*ORIG*> 4 character origin (output file name)
- -D <*DOM*> 3 character domain (output file name)

- http://www.hdfgroup.org/projects/npoess/documentation/nagg/nagg-RM.pdf has complete documentation of the nagg command options.

Demo

- Aggregation (packaged) with geolocation product
- Aggregation of geolocation product only
- De-aggregation (packaged) with geolocation product
- Re-aggregation without geolocation product
- Packaging of 2 sensor data products plus geolocation product
- De-aggregation and un-packaging of 2 sensor data products plus geolocation product

More examples:

http://www.hdfgroup.org/projects/npoess/documentation/nagg/nagg-UG.pdf

Help:

help@hdfgroup.org

Questions/comments?

Thank you!