Data Structures (WG6)

MODEST – Working Group 6
Progress Report

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Introduction

- Goals:
  - ideal: define a dataformat we all use
  - practice: describe a dataformat so it becomes easy to exchange our data
- Done so far:
  - web site with example data (think Virtual Observatory) to gain experience in simulation date types
  - document describing a generic “PointData” dataformat
  - TVO demo at AAS#203
  - TVO whitepaper (Lemson et al.)

Particle Data Storage??

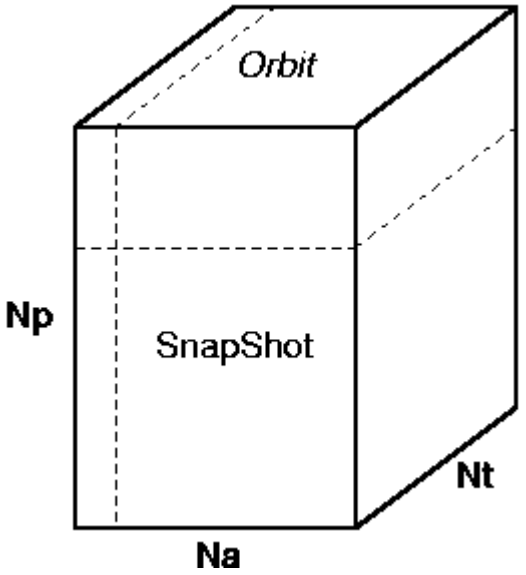
- What properties should a data format have:
  - Exchangeable
  - Archiveable
  - Extendable
  - Portable
  - Scalable

See also: http://www.astro.umd.edu/nemo/tvo

And: http://www.manybody.org (MODEST)

Particle Data

- Tabular vs. Grid Data:
  - Structured grids (AMR)
  - Structured particle (cf. Starlab's **tdyn**)
- Particle-Attribute-Time (PAT) data cube

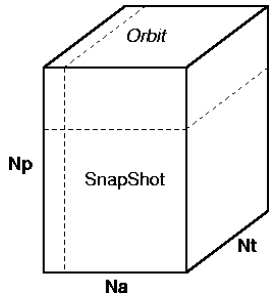


Particle Data: examples

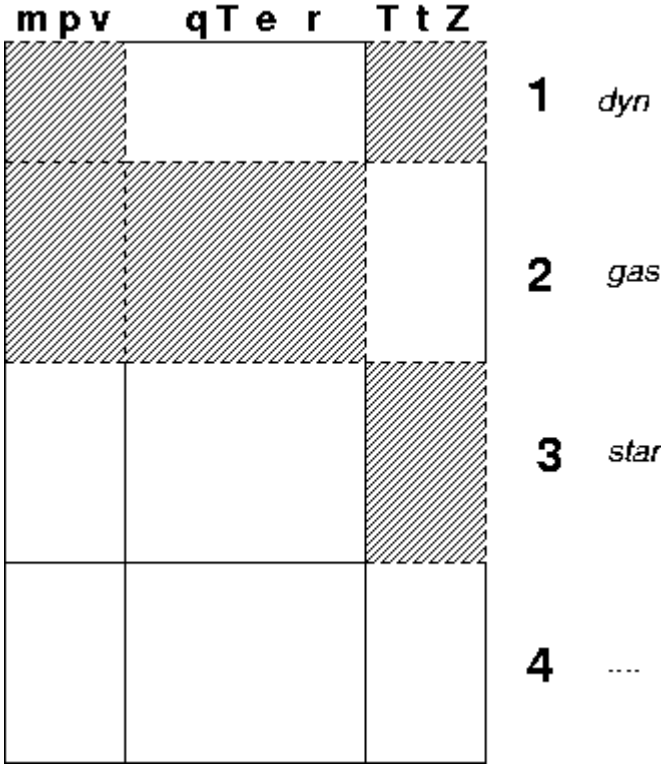
- NBODYx : header + data
- NEMO : (binary) structured files
- FITS : BINTABLE (Teuben, 1995)
- HDF : SDS, Vdata (Bryan & Summers, 1995)
- VOTable

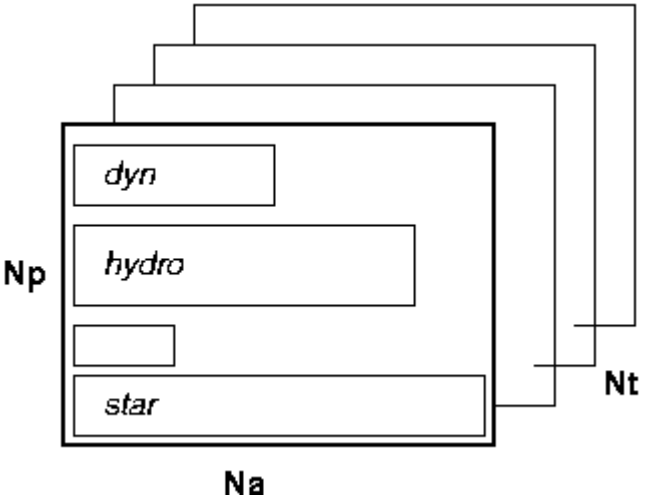
The storage of unstructured data is not described here, however HDF has facilities to handle it.

PAT



- Different types of particles have different attributes

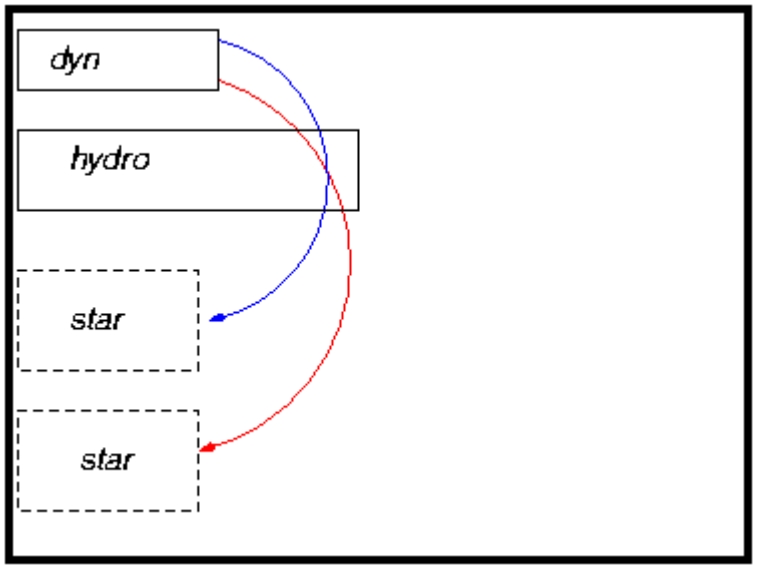




Particle - Family - SnapShot - Album

- Particle: has various attributes (mass, pos, ...)
- Family: Particles with the same kind of attributes
- SnapShot: a set of Family
- Album: a set of SnapShots

Particles can also nest down to a Family
(e.g. Star → SPH-blob)



Unresolved Issues?

- Variable timestep integrators
- Multiple usage of attributes (T, M, ...)
- Data replication ("Greenbank convention")
- Monte Carlo simulations
- Units (Heggie & Mathieu 1986)
- Array attributes (*e.g.* rho(r), s(r), Z(m), ...)

TODO

- between now and MODEST-5:
  - critique the PointData proposal
  - more examples of data for the archive (NEED HELP – will travel)
  - exchange data ? Do we need to? (some converters exist already between popular packages, e.g. NEMO has a fairly large number of them)
  -

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