CGNS Extensions

Reno, 2002

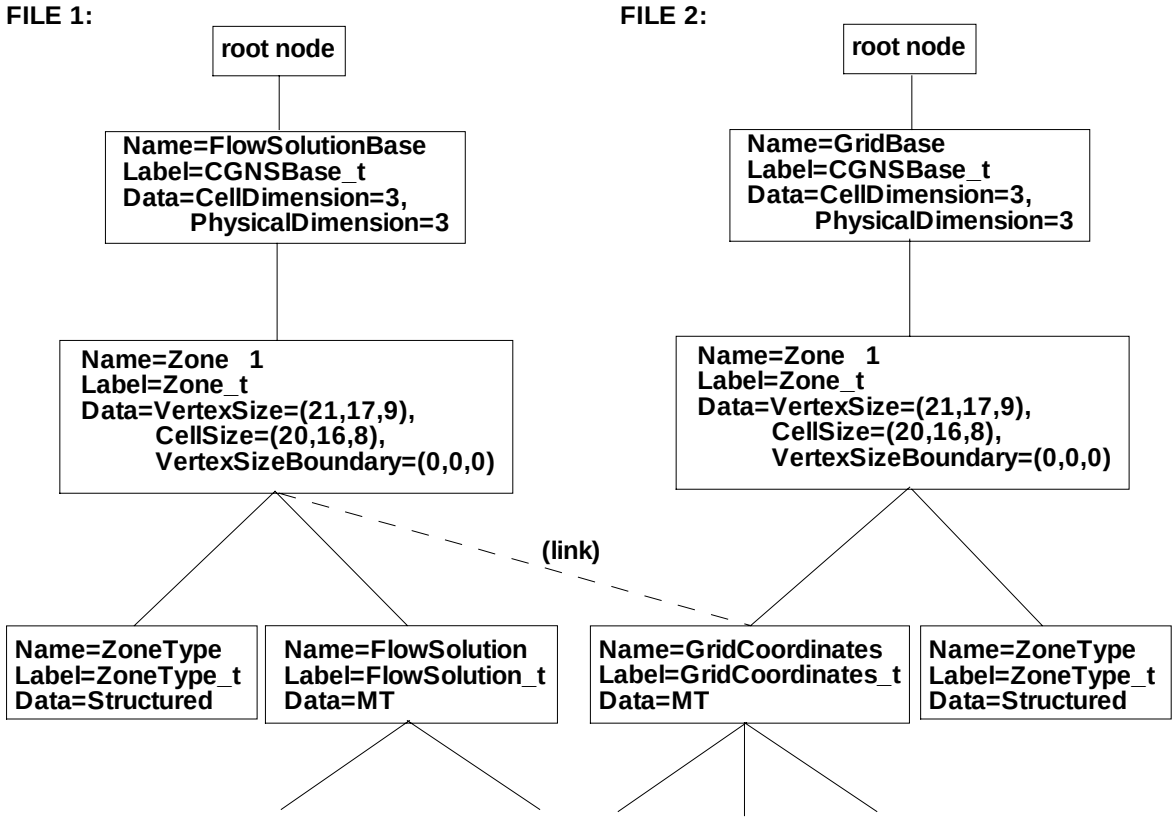
Introduction

- New extensions:
  - Links
  - User Defined data
  - Chemistry & species
- Implemented by Intelligent Light (under contract with NASA Langley)

Links

- Capability has always been there, but only possible to create them with ADF calls
- New API routines have been written:
  - cg_link_write (nodename, filename, name_in_file)
  - cg_link_read (filename, link_path)
  - cg_is_link (path_length)

Example of creating a link



Example of creating a link

While you are in file 1:

filename=‘file 2’
name_in_file=‘GridBase/Zone 1/GridCoordinates’
call cg_goto_f(index,ibase,ier,’Zone_t’,1,’end’)
call cg_link_write_f(‘GridCoordinates’,filename,name_in_file,ier)

User-defined data

- Currently difficult to add arbitrary data (not covered by SIDS) to CGNS file when using API
- Needed, e.g., to hold required code-specific information that is not intended to be used by others

User-defined data

- Identified by the tag: UserDefinedData_t
- Is supported under most existing nodes
- Arbitrary dimensions and dimension values are supported
- Arbitrary number of UserDefinedData_t nodes allowed under each node
- Arbitrary number of DataArrays allowed under each UserDefinedData_t node

User-defined data

- New API routines have been written:
  - cg_user_data_write (user_data_name, index)
  - cg_user_data_read (index, user_data_name)
  - cg_nuser_data (nuserdata)

Example of writing user-defined data

```
real*8 data1(3)
real*4 data2(3,3)
call cg_goto_f(index,ibase,ier,…,’end’)
call cg_user_data_write_f(‘Extra’,index,ier)
call cg_goto_f(index,ibase,ier,…,’UserDefinedData_t’,index,’end’)
call cg_array_write_f(‘MyData1’,RealDouble,1,3,data1,ier)
indx(1)=3
indx(2)=3
call cg_array_write_f(‘MyData2’,RealSingle,2,indx,data2,ier)
```

Chemistry & species

- Still in process, but nearing completion
- Summary of changes:
  - Under FlowSolution, define new field quantity data-name identifiers (e.g.: MassFractionH2O)
  - Under FlowEquationSet, modify GasModel to allow several additional types (e.g., CaloricallyPerfect, RedlichKwong)

Chemistry & species

- Summary of changes (cont'd):
  - Under FlowEquationSet, allow new node ThermalRelaxationModel_t (e.g., type = Frozen, ThermalEquilib)
  - Under FlowEquationSet, allow new node ChemicalKineticsModel_t:
    - e.g., type = Frozen, ChemicalEquilibCurveFit
    - define several data-name identifiers for DataArray_t nodes (e.g., MolecularWeightH2O)
- If needed, other FlowEquationSet information to be stored in Descriptor nodes