# Agenda

CGNS meeting, June 24, 2003, Orlando, FL

- Status of CGNS and outstanding issues
- Discussion of recent issues raised on CGNStalk
  - UserDefined extension
  - BCDataSet extension
  - CGNSVersion
  - Possible need for GridLocation=FaceCenter in ZoneGridConnectivity
- Future directions, needs, and other issues

# Status of CFD General Notation System (CGNS)

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# Outline

- Introduction
- Recent accomplishments
- Where we are
- Current issues/needs
- Where we are going

CGNS
cfd data standard

# What is CGNS?

- Standard for defining & storing CFD data
  - Self-descriptive
  - Machine-independent
  - Very general and extendable
  - Administered by international steering committee
- AIAA recommended practice (AIAA R-101-2002)
- In process of becoming international ISO standard
- Free and open software
- www.cgns.org

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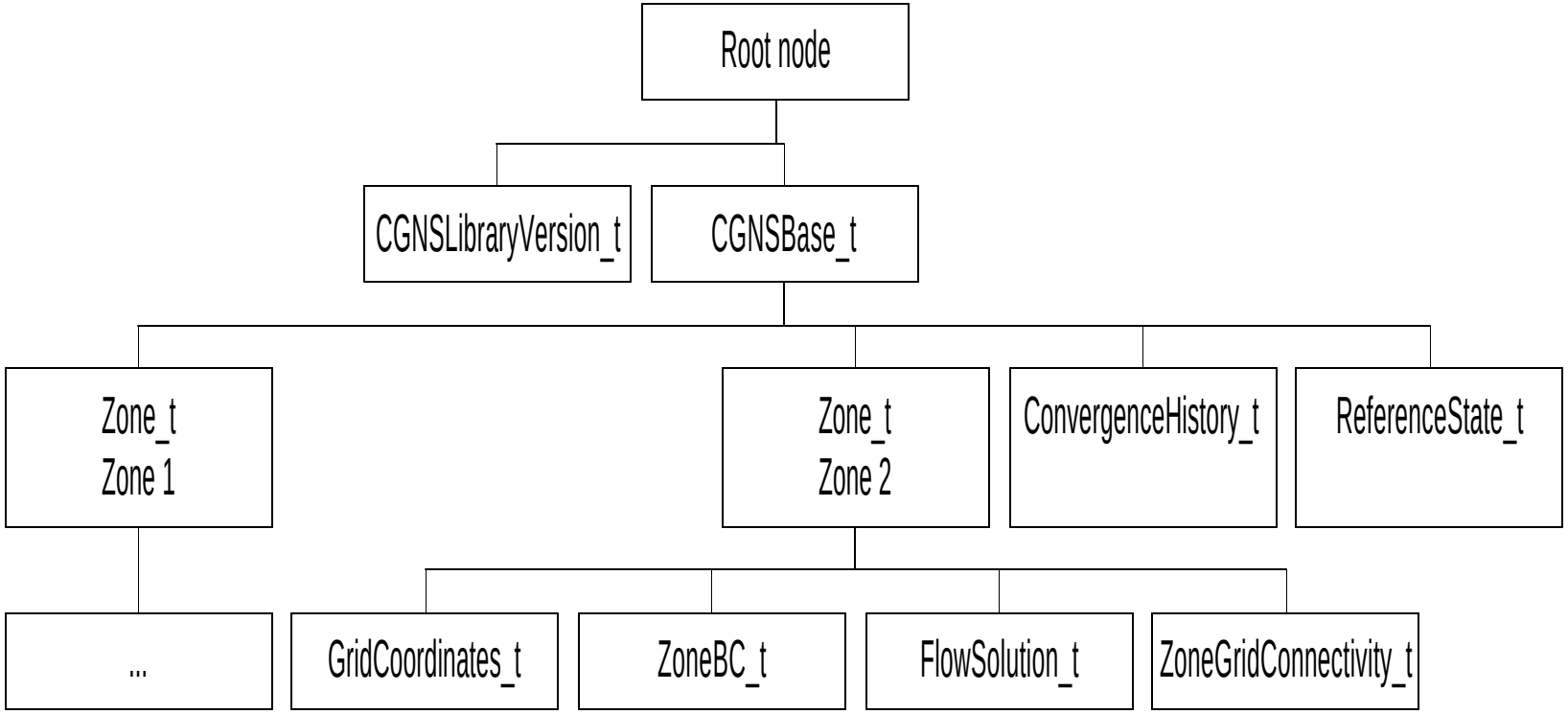
# Typical CGNS file

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# Makeup of CGNS

- Standard Interface Data Structures (SIDS) is the core of CGNS – defines the intellectual content
- Low level implementation is currently Advanced Data Format (ADF)
  - Basic direct I/O operations
  - Software has no knowledge of data structure or contents
  - Tree-based (nodal parent/child) structure
- Mid-level library (MLL) is currently available for C and Fortran
  - This is what most users employ
  - Software has some knowledge of SIDS
  - C++ and Python extensions also available

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# Recent accomplishments

- CGNS now maintained on and available from SourceForge (sourceforge.net)
- Latest version is 2.2
- Utility “adfviewer” available for viewing & translating CGNS files
- Extensive web-based and pdf documentation available
- CGNStalk@grc.nasa.gov discussion group

# Where we are

- SIDS & software reliable and well-tested
- Most current proposals for extension (to SIDS) are relatively minor/specific
- Acceptance as ISO standard is progressing (but stalled in 2003 due to budgeting problem)
- Many people beginning to use CGNS, but mostly as an “option” – it has yet to gain full acceptance as a standard

# Current issues/needs

- Replacement of underlying ADF with HDF5
  - Prototype (written by Poinot) is available
  - Needs evaluation and further work
  - Adds parallel capability and would help propel CGNS to wider use/acceptance
- Need to reconcile ISO specs (STEP documents) with latest SIDS
- New proposals for extension need review, then implementation

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# Where we are going

- Resolve current issues/needs (last slide)
- Replace ADF with HDF5 for commonality and growth
- Continue “advertising”: Poinot et al. abstract submitted for Reno 2004, “Impact of CGNS on CFD Workflow”
- Push to get more of the widely-used CFD codes to implement CGNS
- Maintain an active & diverse steering committee

# Discussion of recent issues raised on CGNSTalk

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# UserDefined extension

- Allow the following additional children:
  - PointRange, PointList, GridLocation, FamilyName, Ordinal
- Would need new MLL functions, e.g.:
  - cg_ptset_write, cg_ptset_read, cg_ptset_info
- Purpose: extends usefulness of UserDefined node

# BCDataSet extension

- Allow the following additional children:
  - PointRange, PointList, GridLocation
- Would need new MLL functions, e.g.:
  - cg_ptset_write, cg_ptset_read, cg_ptset_info
- Purpose:  allows auxiliary BC data info to reside at different grid location from the indices that define the BC patch

# CGNSVersion issue

- Problem:  if write CGNS file without CGNSLibraryVersion node, then reading the file using MLL can cause problems
- Current fix:  make CGNSLibraryVersion node mandatory part of CGNS file (this is a fix to the documentation only)
- Question: is a proposal for a separate CGNSVersion node needed?
  - Maybe not, because MLL and SIDS maintain the same numbering (e.g., “2.2”)

# GridLocation issue

- Currently, connectivity information is always with respect to the vertices for abutting-type interfaces, and can be either Vertex or CellCenter for overset-type
- Should GridLocation=FaceCenter also be allowed?
  - Particularly desirable for unstructured grids

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