Rind_t data for unstructured zones

We at the Center for Simulation of Advanced Rockets at the University of Illinois have developed a CFD application which is a finite-volume solver that uses unstructured zones. Like other solvers of this type, our code's parallel algorithm requires rind data to maintain high-order accuracy near zone boundaries. Since it takes considerable computational effort to reconstruct the rind elements or to pass the corresponding information between zones, we would like to see the CGNS format extended to support rind data for unstructured zones. In order to maintain compatibility with older versions of CGNS, we propose the following convention:

> Rind vertices would be identified using a Rind_t node, just as they are for structured zones. The vertices would be sorted so that core vertices are contiguous and rind vertices would be at the beginning and/or the end or the GridCoordinate arrays. This convention could require that rind vertices always come at the end of the arrays, for the sake of both simplicity and for backward compatibility with most existing software when relinked with the new CGNS library.
>
> Rind elements would be identified by RindElement_t nodes, which would be identical to Element_t nodes in all ways except node type, and would have a set of access routines analogous to cg_section_write, etc.

Implementing Rind vertices requires only the removal of a few lines of code from cgns_internals.c. Implementing RindElement_t nodes shouldn't be too troublesome, since code for Element_t nodes could be reused.

We hope that this extension will be discussed here and at the next CGNS steering committee meeting. If we can help in any way, please contact John Norris at jnorris@mcs.anl.gov .

--
Robert A. Fiedler, PhD
Technical Program Manager

Center for Simulation of Advanced Rockets
University of Illinois
2266 DCL (217) 333-TREK (8735)
rfiedler@uiuc.edu