

## **Appendix II. Programming, Maintenance and Upgrade**

Whereas database design, documentation and management will be instrumental in this endeavor a great deal of its once-in-operation success will rely on programming the different components of the framework.

An open source object-relational database management system, PostgreSQL, will be adopted to develop the Hobbes DMDS. PostGIS, an extension of PostgreSQL, will realize the geospatial SQL functionalities in databases. Ancillary models employed in the Hobbes project framework require a dynamic bi-directional connection with both DMDS and the Scenario Manager, such that economic or hydrologic information can be streamlined into the network assembled by the Network Manager. This requires a spatial and temporal pre-match of the DMS and the ancillary model elements that will also be congruent with the time step and the level of development selected. This has to be part of the ancillary model conduit coding.

For connecting to other platforms co-development objectives will have to be set. The type of programming will depend on the type of elements or objects and what direction they are being moved. For transfer from Hobbes to other model platforms specific scripts that translate entire sub-networks or some elements such as penalties, environmental constraints, shadow values, or physical characteristics will be needed. For transfer from other models to Hobbes, network elements in the DMDS database will have to be matched and be general enough to accommodate the features of other models, while in some cases additional DMDS elements will have to be built.

As information technology and demands evolve software will need to be updated and upgraded. The success or failure of previous statewide modeling efforts can be partially attributed to how well the databases and documentation held up to changes in mainstream software and information needs. Software maintenance should be aimed at preventing the loss of capabilities in the data management, network manager, and scenario manager components when updates on the host operating systems or other third-party components occur. The maintenance effort shall be focused on function of the supported platforms and any marginal change in the Hobbes project hosting platforms.

A second element in the Hobbes project is given by the upgrade strategy. This includes redesign and reprogramming of the different database, network and scenario managers, visualization tools, and translators. This can occur in an incremental way or in periodic, major upgrade efforts when the pool of resources is large enough.

Lastly, policies and protocols for the use of Hobbes shall be provided to different categories of users including developers, modelers, and basic-level information users. Each category of user will demand and/or provides different sets of resources to keep the Hobbes Project functioning to desirable standards.