



The Generic BlackBoard (GBB)

Distributed Multi-Agent Systems (DMAS) is an emerging architecture solution for complex distributed near-real-time systems. DMAS based solutions can be found in many domains including: Game systems, machine learning, modeling and simulation, Military command and control, and different types of expert systems.

The DMAS architecture provides for the utmost flexibility in system design, system modularity, component reusability, system scalability as well as optimal use of computational resources.

Development Framework for Distributed Multi Agent Systems

HarTech Technologies Ltd. provides a complete framework for the development of Distributed Multi-Agent Systems. The **GBB Development Framework** enables developers to implement DMAS applications without the need to cater and devote effort for all the "troubling" issues of Data sharing and Distribution, Agent activation, Intersystem messaging, Multi threading and Multi-process activation.

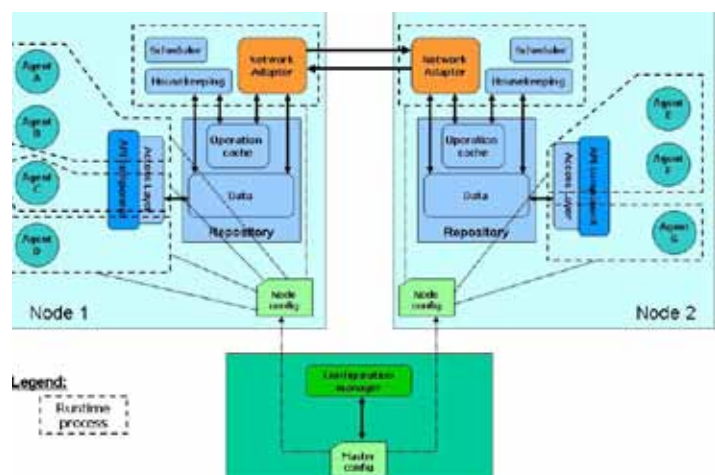
The **GBB Development Framework** enables the developers to focus on the real issues of the system while allowing the fully tested infrastructure provided by the GBB to cover and manage all the "system management" related issues.

The **GBB Development Framework** is a complete package, that enables the user to develop his own applications in C++ or C# based on the **GBB** while utilizing all the code, features, and infrastructure already available within the **GBB Framework**.

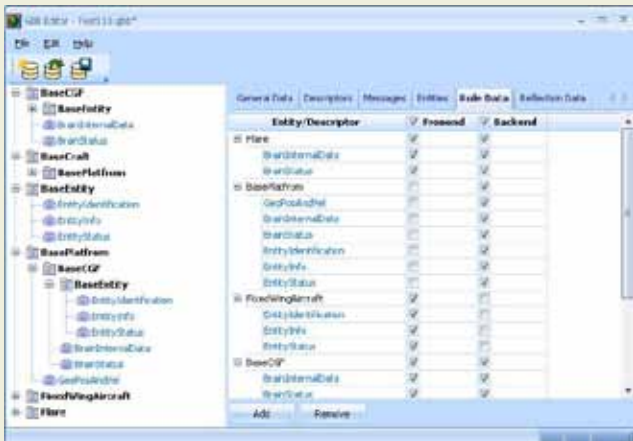
The GBB Distributed Multi Agent application development framework enables the developers to:

- Develop simple software modules which easily integrate with others over a distributed application
- Develop Multi-Process, Multi-Thread, Multi-Core, and Multi-CPU applications
- Reconfigure the application by moving Agents from one process to another and between computers without affecting the system integration
- Develop advanced and complex modules which easily integrate with a running environment with no need to modify it

The Application Framework



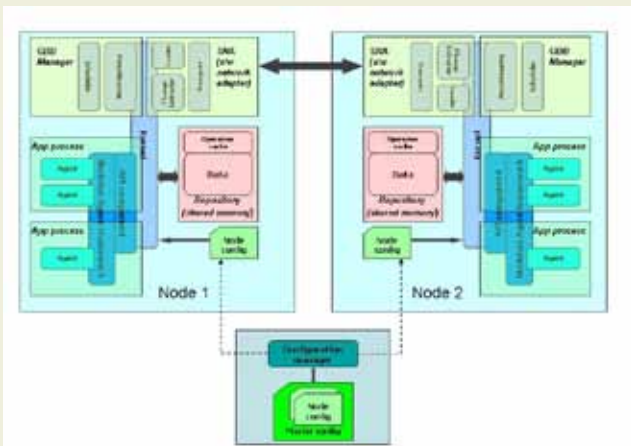
The **GBB Development Framework** comes complete with supporting utilities to enable the user to immediately focus on the development of his application while minimizing the required effort to deal with the “logistics” of the implementation.



The **GBB Editor** is a graphical applications editor used to define the data structures and messages for a specific application, which are to be used in order to share the data between the different Agents.

The **GBB Editor** encapsulates modern development techniques which enable the use of polymorphism, inheritance as well as part of the application messaging definition.

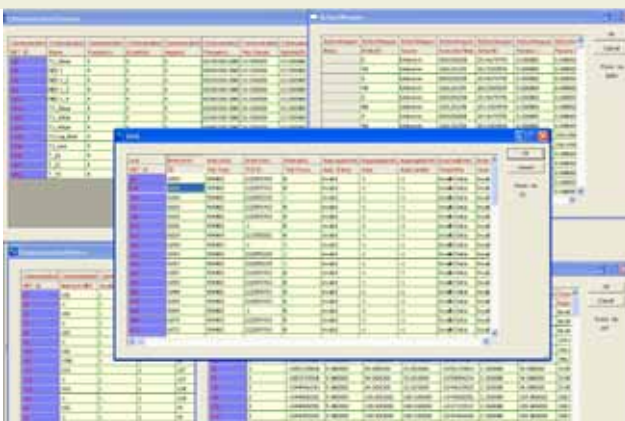
The **GBB Editor** also support the system configuration for deployment enabling the definition of the different computation nodes to be used for the execution of the Agents



The **GBB Framework** The Framework itself is a complete SDK that enables the development of the different Agents. The Framework provides a complete API to the different data structure and application scheduler to enable efficient application development.

The main functionality provided is:

- Agent Activation – Periodic and Event Driven
- Data access – using DMA as well as filtered iterators while supporting polymorphism and inheritance
- Messaging – Incoming and outgoing message management
- Distribution - Ensuring the availability of the data throughout all the computation nodes in the system.



The **GBB Monitor** is a debug application enabling the developer to view the application data as it is updated in real time by the different Application Agents thus supporting the debugging of the application which is done in the natural development environment.