

Network Centric Simulation

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Outline

Network Centric Simulation — (NCS)

- ◎ **NCS Concept**
- ◎ **NCS Characteristics**
- ◎ **NCS Application Pattern**
- ◎ **NCS Architecture**
- ◎ **Interoperation between NCS and C2 system**
- ◎ **Conclusions**

NCS Concept

Net-centric simulation (NCS) is a novel distributed simulation method, which utilizes the information grid infrastructure, adopts service oriented architecture (SOA), defines unified standards to describe, access and share simulation resource, and complete specified simulation application task by dynamically building and running the community of simulation task (CoST)

NCS Characteristics

- ◎ Service-oriented

Specifications for simulation resource description, publishing and integration are established. Legacy systems and functions are encapsulated as a service. These simulation resources are shared on the network and invoked to compose a simulation system.

- ◎ Information grid characteristics

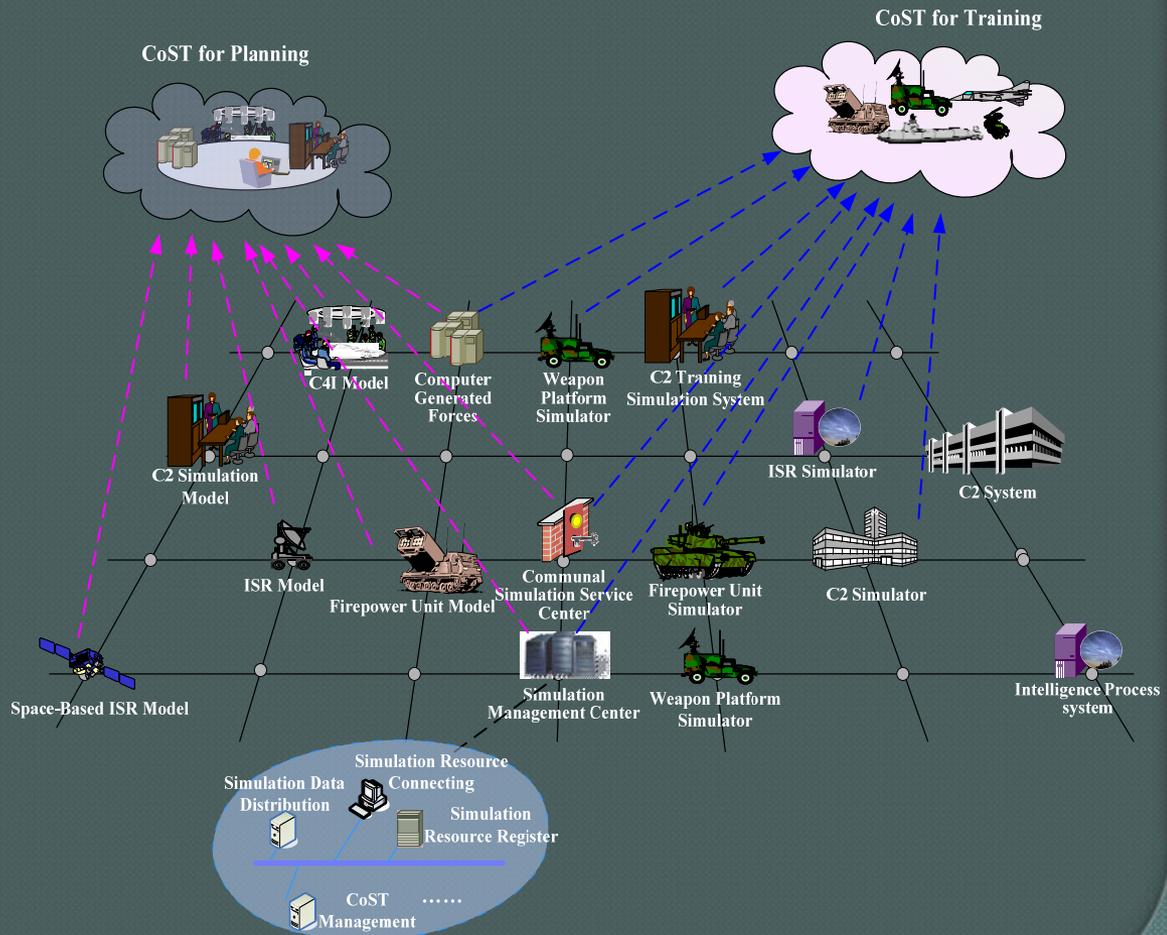
NCS environment is distributed, heterogeneous, expansible and autonomous.

- ◎ Dynamic implementation of task-oriented simulation system

For a specified simulation task, task-related simulation resources will be queried and organized to form a CoST and the CoST runs under the support of simulation runtime support platform.

NCS Application Pattern

A community of simulation task (CoST) is a temporary organization formed for certain appointed simulation task. Its members are distributed on the network, including simulation basic resource, simulation application resource, simulation support resource, practical system, etc. To complete a simulation task, the related resources are searched, located and closely coupled.



NCS is implemented in the manner of dynamical organizing the task-related simulation resources to construct and run various CoSTs for different simulation tasks.

CoST implementation process

- a) Define simulation task by simulation configuration tool
- b) Search available simulation resources on the network and configure their interaction relationship
- c) Integrate the located simulation resources into a CoST in the way of service composition
- d) Run the CoST to accomplish its simulation task under monitoring and managing

NCS Architecture

1) Simulation application service layer

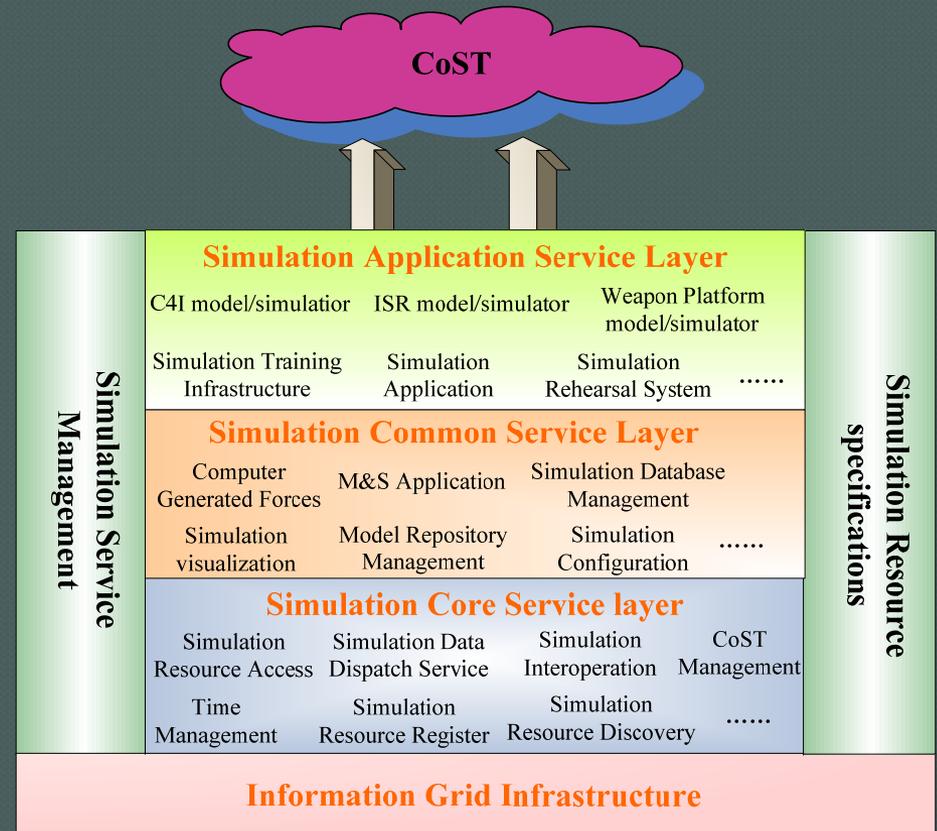
C2 model/simulator, ISR model/simulator, weapon platform model/simulator, simulation rehearsal system, simulation training facility, etc.

2) Simulation common service layer

CGF tool, modeling tool, simulation database management, simulation visualization toolkit, model library management tool, simulation configuration tool, etc

3) Simulation Core service layer

simulation resource accessing, resource registration, simulation interaction, time management, simulation data distribution, etc.



4) Information grid infrastructure

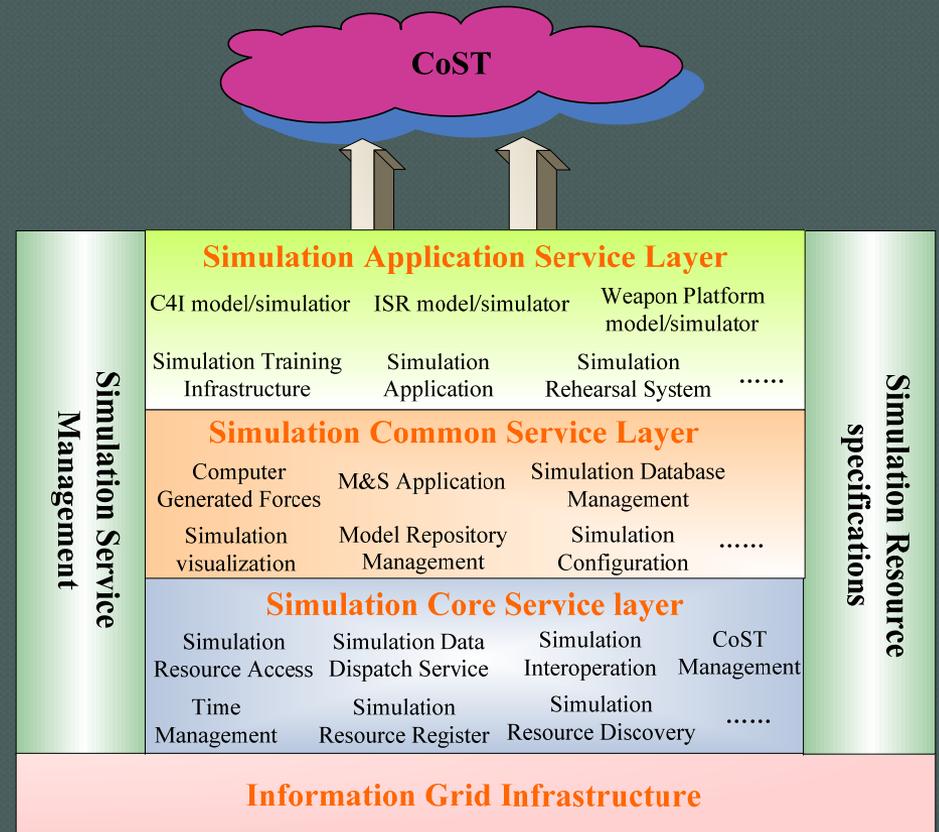
communication, resource scheduling, resource monitoring and resource management, computing resource, storage resource, network resource, etc.

5) Simulation service management

responsible for monitoring and managing the simulation resources in the CoST to keep it running in order.

6) simulation resource specifications

prescribe the unified standard specifications for the simulation resource development, publishing, sharing and integration.

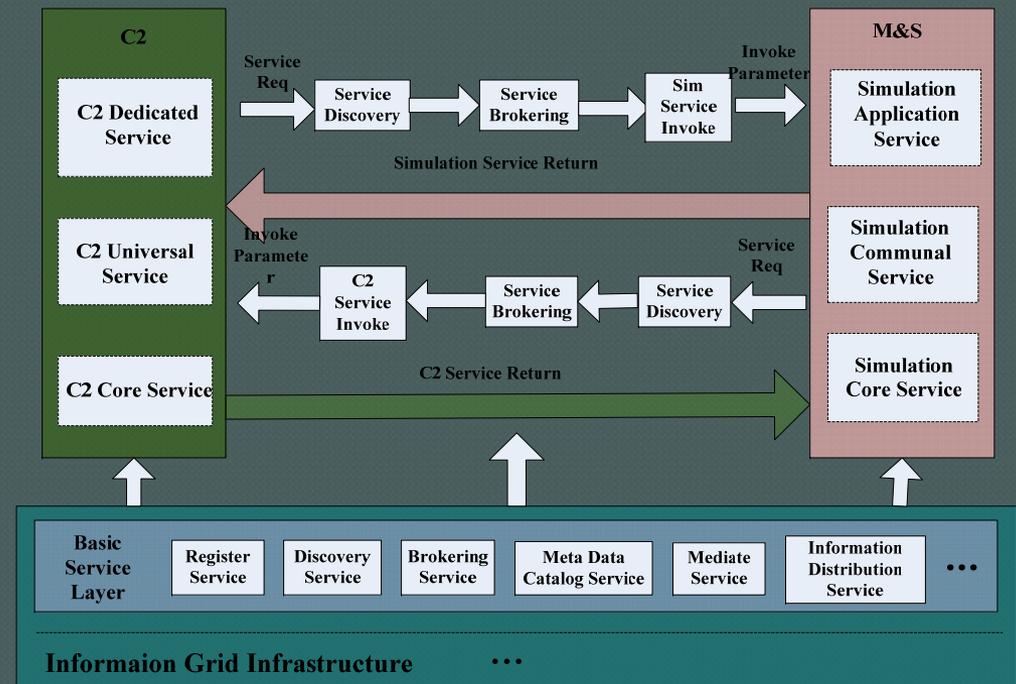


Interoperation with C2 system

Both the M&S and C2 system will be founded on a common information grid infrastructure, adopt service-oriented architecture, and utilize the same standards.

Simulation-based capabilities like training, decision support and the MCPs in future C2 system would be registered, published and shared as services through utilizing the registration, discovery and metadata catalog services in the information grid infrastructure.

Under the support of information grid infrastructure, M&S and future C2 system can realize interoperation by service invocation



Conclusions

NCS is a novel M&S method agreeing with the NCW, and this paper proposes some thought on it. Further research will be focused on the designing, developing and validation of the proposed concept and method. Through constructing the NCS prototype system, the proposed concept and method will be validated and improved.

Thanks