

NetPlane Core Services

Service Availability Forum Compliant HA Middleware

DATASHEET

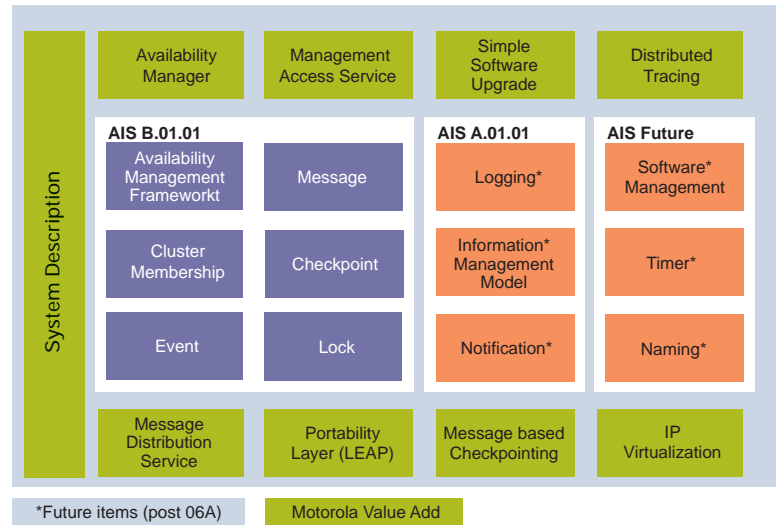


KEY FEATURES

- Pre-integrated and verified software suite accelerates time-to-market
- Significantly reduces development costs and development resources required
- Service Availability™ Forum compliant (AIS and HPI)
- Scalable from small platforms to large, multiple shelf systems
- Includes a distributed message passing infrastructure
- Operating system (OS) independent

NetPlane® Core Services software (version 06A) is designed specifically to meet the high availability needs of the telecom industry and is the foundation on which all other NetPlane Software modules are built. NetPlane Core Services complies with the Service Availability Forum (SA Forum) AIS and HPI specifications and is enriched by a host of complementary services that facilitate the creation of a complete service availability solution.

NetPlane Software is architected to be platform independent and is sold as part of Motorola's Avantellis™ series of pre-integrated and verified platforms. The functionality required to adapt NetPlane Software to a specific hardware platform is captured in NetPlane Platform Control software. All NetPlane Software modules are fully integrated and verified which accelerates product time-to-market, significantly reduces development cost and enables equipment manufacturers to focus their resources on to the development of differentiating services.



NetPlane Software is a family of software products from Motorola that provide an open, standards-based software execution environment for equipment that delivers high service availability. NetPlane Software is designed to support a wide range of applications in telecommunications and other industries that require a combination of computing power, high-performance communications and "always-on" capability. The first product in the NetPlane family is NetPlane Core Services, a suite of HA Middleware that implements the Service Availability Forum (SA Forum) Application Interface Specification (AIS) and uses the Hardware Platform Interface (HPI) specification.

SYSTEM ARCHITECTURE

NetPlane Core Services is a platform independent software module and therefore requires an architecture that allows it to accommodate a variety of hardware platforms, operating systems, processor technologies, and multi-platform scalability. A complete listing of the features available in NetPlane Core Services is outlined in subsequent sections of this datasheet, below is brief description of some of the services, and their specific implementation, that illustrate the flexibility and scalability of the architecture.

Platform portability is a key feature of NetPlane Core Services. The majority of telecom equipment providers have multiple hardware platforms to address the control plane and data plane requirements of their wireline and wireless platforms. Further, geographic/regional preferences may mandate different platform form factors. The ability to utilize a single, standards-based high availability software application across multiple platforms can result in both quicker time-to-market as well as substantial resource saving from a software maintenance and support perspective. NetPlane Core Services has been ported to, and proven on, Motorola's AdvancedTCA® platforms as well as the IBM's eServer BladeCenter systems. Future platforms include Motorola's MicroTCA™ platforms.

Some of the key features provided by NetPlane Core Services are implemented in a distributed fashion to ensure scalability. The system controller logic and configuration of NetPlane Core Services is protected in a 1+1 redundancy mode so that any single point of failure inside of NetPlane Core Services does not compromise the availability of the system.

Although NetPlane Core Services is a platform independent software module, it must be ported to a particular platform in order to become part of a revenue generating product. NetPlane Core Services provides hooks into the platform at multiple levels. This is captured in the NetPlane Platform Control software that provides all the required functionality to enable NetPlane Software on a specific platform. To date, there are two hardware platforms that have a working, proven NetPlane Control software module; Motorola's AdvancedTCA platforms and IBM's eServer BladeCenter systems.

SERVICE AVAILABILITY FORUM COMPLIANT FEATURES

The SA Forum (www.saforum.org) is an industry consortium dedicated to creating open standards for high availability middleware. Members include such industry leaders as Motorola, Siemens, Lucent, Ericsson, Nokia, Nortel, Oracle, IBM, Intel, HP and others. The SA Forum's mission in the communications and computing marketplace is to foster an ecosystem that enables the use of open standards-based building blocks in the creation of high availability network infrastructure products, systems, and services. To achieve this, the SA Forum develops and publishes high availability and management software interface specifications, and promotes and facilitates their adoption by the industry.

There are three SA Forum specifications. The Application Interface Specification (AIS) defines the interface between applications and high availability (HA) middleware, making each independent of the other. The Hardware Platform Interface (HPI) defines the interface between the hardware platform and the HA middleware and makes each independent of the other. The Systems Management Specification (SMS) defines the interfaces to access, monitor the control all aspects of the AIS and the HPI interfaces, as well as a comprehensive notification interface for HA systems.

NetPlane Core Services support the following SA Forum AIS compliant services:

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Availability Management Framework B.01.01

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Cluster Membership Service B.01.01

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Message Service B.01.01

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Lock Service B.01.01

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Event Service B.01.01

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Checkpoint Service B.01.01

Availability Management Framework — Provides a framework to coordinate all the redundant services within a cluster in a distributed computing environment. It also monitors the health of application components and executes recovery and repair procedures per the configured policy.

Cluster Membership Service — This service provides applications with membership information about all nodes within the cluster. A complete cluster membership roster is maintained via a unique "node name" assigned upon joining the cluster. Application processes may register with the Cluster Membership Service to receive membership change notifications.

Message Service – A buffered message passing system based on message queues. Messages can be written to or read from these message queues. Messages are maintained during application switch-over.

Lock Service – A distributed lock service for use within a cluster when multiple processes may be competing for access to a shared resource. It supports two lock models; one for exclusive access and one for shared access.

Event Service – A publish/subscribe, multipoint to multipoint, asynchronous communications mechanism to distribute events within the cluster. Subscribers are anonymous, meaning they can join/leave without any Publisher interaction.

Checkpoint Service – Provides a facility for processes to record checkpoint data incrementally. The checkpoint data can be retrieved after fail-over or switch-over and application execution resumed in the correct state. The replicated data (referred to as checkpoint replica) can be stored in multiple nodes within the cluster, but will be deleted after a set time to avoid accumulation of unused checkpoint data.

NetPlane Core Services also uses the SA Forum HPI A.01.01 defined APIs for integration with the underlying platform.

COMPLEMENTARY SERVICES

In addition to SA Forum compliance, NetPlane Core Services includes complementary services that address and resolve additional requirements for a complete service availability solution. Some of these services are completely outside the scope of the SA Forum and others build upon and/or supplement SA Forum services.

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Simple Software Upgrade

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Availability Manager

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Message Distribution Service

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Message Based Checkpoint Service

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Management Access Service

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Virtual IP and I/O Interface Service

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System Resource Monitoring Service

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Software Portability Service (LEAP)

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Distributed Tracing Service

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HPI Integration Service

Simple Software Upgrade — This service provides the ability to install and upgrade the operating system, NetPlane and application software for each node in platform.

Availability Manager — This service internalizes the fault domains of a system across hardware and software entities. It straddles the SA Forum AIS and HPI conceptual models by leveraging both the Availability Management Framework and Hardware Platform Interface. The Availability Manager integrates these mechanisms, automating fail-over and recovery of hardware and software in sub-second time. These functions ensure system reliability with fault detection, fault isolation, fault recovery, and fault repair. The Availability Manager provides system-level fault management as part of a comprehensive, distributed hierarchy of fault policy management within the NetPlane Software environment.

Message Distribution Service — Most modular platforms require some form of message passing mechanism in order to efficiently communicate to/from different physical entities within the platform. The Message Distribution Service within NetPlane Core Services implements a light weight, high performance reliable, peer-to-peer messaging service that provides the foundation for distributed middleware. The Message Distribution Service allows distributed applications and protocol implementations to communicate within the scope of a system.

Message Based Checkpoint Service — This service provides a framework to let active and standby instances of an application synchronize state information through messages instead of storing replicas.

Management Access Service — This service creates a single access point for all management operations. It tracks the locations of objects to be viewed and controlled, relieving the client of these responsibilities. Management access methods supported by the Management Access Service include Command Line Interface (CLI) and Simple Network Management Protocol (SNMP). The software infrastructure for both the CLI and SNMP are extensible to allow customers to add their own management objects. A Persistent Store Service is also included as part of the Management Access Server. This provides a central, persistent storage facility to store and replay configuration data.

Virtual IP and I/O Interface Service — This service provides API to move virtual IP addresses across nodes in case of a failover. It also provides a distributed repository for all interface data within the system and makes it available to applications on any node.

System Resource Monitor — Applications can subscribe to this service and receive alerts when resources that the application relies upon are compromised. An example could be a “low memory” alert and the “result” could be to throttle application throughput.

Software Portability using LEAP — Although there is a strong move towards Carrier Grade Linux (CGL) as the operating system of choice for new telecom applications, there is still an enormous amount of existing applications written to other standard operating systems. LEAP is an OS abstraction service that allows NetPlane Software and customer application code built with the LEAP abstractions to be used in multiple OS environments without modification.

Distributed Tracing Service — Provides a mechanism for applications to post fault related information to the system. This service can be also be used as a logging service until the SA Forum addresses this functionality.

HPI Integration Service — This service makes HPI events accessible to other NetPlane services and applications by publishing the events on an advertised event channel.

Motorola will continually update NetPlane Core Services to reflect SA Forum specification additions as well as add complementary services that address the complex requirements of service availability which fall outside the scope the SA Forum.

RELEVANT STANDARDS

SA Forum Application Interface Specification (AIS),
revision B.01.01

Availability Management Framework

Cluster Membership Service

Message Service

Lock Service

Event Service

Checkpoint Service

SA FORUM HARDWARE INTERFACE SPECIFICATION (HPI), REVISION A.01.01

HPI Integration Service

NetPlane Core Services can be implemented for a wide range of high availability applications within the Telecom industry, and beyond. It is SA Forum compliant and is focused on improving our customers' time to market, lowering their development cost, allowing them to focus on their value-added activities and protecting their investments in technology.

SOLUTION SERVICES

Motorola provides a portfolio of solution services optimized to meet your needs throughout the product lifecycle. Design services help speed time-to-market. Deployment services include global 24x7 technical support. Renewal services enable product longevity and technology refresh. And solution extras include enhanced warranty and repairs.

Sales Offices

Tempe, AZ U.S.A. 1 800 759 1107 or +1 602 438 5720
Paris, France +33 1 69 35 25 88
Munich, Germany +49 89 608 14-0
Loughborough, UK +44 1509 634300

Tel Aviv, Israel +972 3 568 4385
Shanghai, China +86 215292 5693
Tokyo, Japan +81 3 5424 3101
Hong Kong, China +852 2966 3209

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