

White paper

FUJITSU DynamicLoM Technology

Network connectors as individual as you are to make options as a standard. Meet your needs with FUJITSU DynamicLoM – for the flexibility you need.



Content

Today's situation	2
Become more flexible	2
Selection is the standard	2
Form factor with ease-of-use	3
Market-leading feature-set	3
Interface Card Overview	3
Interface Card Feature Details	4
Conclusion	4

Today's situation

Each server always came with an embedded Ethernet connector for integration in your existing infrastructure. Starting with 10/100 Mbit/s in early years, later systems were elevated to newer and more current standards available with typically 2/4x 1 Gbit/s or 10 Gbit/s network interfaces. Referred to as LAN-on-motherboard (LoM), this solutions represented a very cost efficient solution, as long as the Ethernet interface and controller were what was needed. But sometimes the architecture with a network interface card (NIC) occupied PCI slots that were necessary for other components or enhancements were not possible with easy solutions.

The diversity in the market, the need and demand for more flexibility in a continuously changing world required a change of thinking. This is why Fujitsu sets new standards for its systems, introducing FUJITSU DynamicLoM technology. This gives IT-responsible the chance to configure their LAN adapter the way it needs to be – seamlessly integrated and ready for future changes.

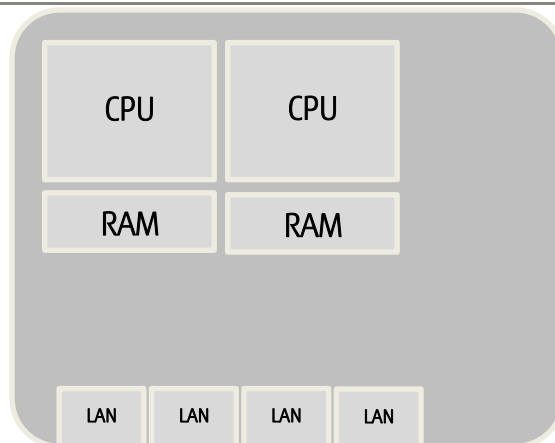
Become more flexible

FUJITSU DynamicLoM technology marks a new way of LoM integration. As a variation of a LAN-on-motherboard architecture, it allows for the selection of an interface card that best meets the needs of a PRIMERGY dual socket server setup. To give you the flexibility you need at the initial server installation as well as in future in changing conditions.

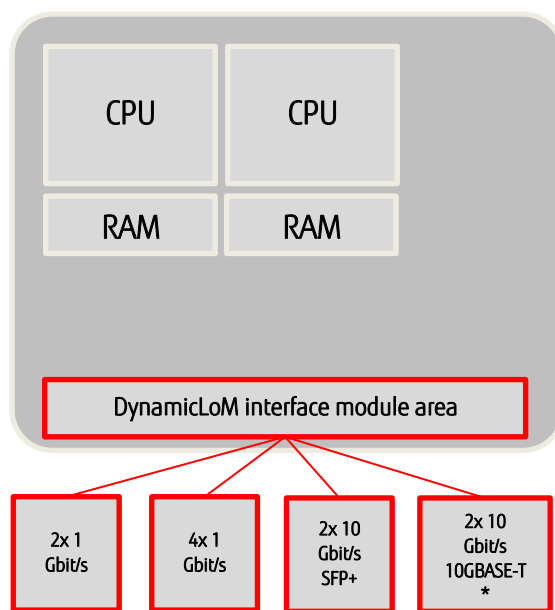
Selection is the standard

The motherboard has a latest generation Emulex XE104 CNA chip embedded, ready for today's and also future technologies. The converged network adapter chip is linked with an interface module area for the respective interface card of choice with the big advantage not to occupy any PCIe-slot for the different available adapters.

For SMBs, the options range from a 2x 1Gbit/s solution to a 4x 1Gbit/s DynamicLoM connector. For datacenters or other markets requiring high bandwidth, Fujitsu also offers DynamicLoM with 2x 10Gbit/s incl. SFP+ or 10GBASE-T*. For your final system configuration, you really just buy the interace card you need – this is how we understand flexibility.



Systemboard with typical LAN on motherboard



Systemboard with DynamicLoM technology



RX2540 with 4x 1Gbit/s DynamicLoM interface card

*Available 11/2014

Form factor with ease-of-use

The interface cards are pre-defined in form factor:

- lowering replacement cost and decreasing service and maintenance complexity
- perfect integration for in-chassis space efficiency
- functionality and connector type are determined by the interface module, not the whole NIC unit, making it easy to select what is needed
- DynamicLoM is a solution not only providing flexibility for the selection of the “right” connector, moreover it also does not occupy a PCIe slot. This leaves you enough headroom for all possible I/O-configurations now or in future

Market-leading feature-set

FUJITSU DynamicLoM delivers you not just with a very flexible and scalable solution, but also offers a market-leading feature set, depending upon form factor.

Universal Multi-Channel (UMC) partitions every physical port to enable for up to 8 physical PCI functions per port. (10Gbit/s interfaces only) Every channel can be configured as required by the connected service/network resource to always supply with the exactly needed amount of bandwidth. This increases the utilization of bandwidth for different tasks resulting in a reduction of cost-per-GB of bandwidth. For the operating system, each physical function appears to be a physical port. This “bypass” of the host by e.g. a virtualized machine also allows for better performance with no utilization of the hosts’ CPU compared to software-emulated NIC devices. This set-up of distinct functions and unique MAC addresses delivers high flexibility for virtualized and non-virtualized environments with no essential changes to the operating system or hypervisor. Additionally, UMC maximize the configuration flexibility for storage environment with full protocol offload, each port can support two storage functions (one FCoE or one iSCSI) in addition to the NIC functions. The network compatibility is easy and cost-saving: Further changes in the infrastructure are not necessary as Universal Multi Channel works with any 10GbE switch on the market.

Fibre Channel over Ethernet (FCoE) (10Gbit/s SFP+ interfaces only) and iSCSI (1Gbit/s and 10Gbit/s interfaces)/iSCSI boot with full off-load (10Gbit/s interfaces only) guarantee for fast Ethernet connections for storage tasks in LAN and WAN without compromising the speed of the systems’ CPU, resulting in a better performance of the whole system and no necessity to advance the infrastructure - keeping network complexity at a minimum. Additionally, a dedicated storage adapter is no longer needed.

The demand for high performance and CPU efficient storage I/O operations contingent upon the processing of huge amounts of data

in cloud, mobile and analytics is inexorable. High performance storage I/O options involve multiple tradeoffs between CAPEX, OPEX and resiliency. Therefore, Microsoft developed the Server Message Block (SMB) protocol. Remote direct memory access is the underlying protocol over Converged Ethernet. RoCE architecture directly addresses two key limitations of current compute and networking architectures, namely overhead created by data copies between user (application) and kernel memories and latencies introduced by the TCP/IP protocol. Data Center Bridging (DCB) is the key as RoCE leverages Converged Ethernet to reduce data latency and improve throughput. It so eliminates the data placement and data copy step for faster storage access while simultaneously reducing CPU utilization facilitating processing resources for a better application performance. In virtualized environments, the gained headroom in CPU performance thanks to RDMA over Converged Ethernet results in reduced time and CPU utilization for Hyper-V Live Migration and VMotion. The support of RoCE and all related protocols are unique to Fujitsu PRIMERGY servers.

Single Root I/O Virtualization (SR-IOV), allowing for virtual machine network functionality, reserves a “slice” of the NIC which is directly assigned to bypass the host. SR-IOV enables multiple virtual machines to directly access the NIC’s physical I/O-resources. Using the concept of physical and virtual PCIe functions, the controller can appear as multiple physical and virtual devices. This allows for a higher I/O performance compared to a software-emulated NIC solution and a lower thus better CPU utilization. Compatibility with VMware Sphere 5.1 (and higher) and Windows Server 2012 (and higher) supporting this functionality is given.

In a highly virtualized IT architecture, network can reach its limits, either in terms of amounts of service or due to the evolution of cloud services demanding thousands of virtual LANs. Overlay Networking is a solution to these problems to react properly. It does not just allow for easier network integration and hence precious time savings, it also facilitates the chance to create up to 16 million private, isolated networks necessary in today’s challenges in the situation of big data. Overlay Networking for Virtual Machines and their data interchange require different needs for hardware. The Fujitsu solution, in conjunction with Emulex, supports two leading tunnels in hardware offload, NVGRE by Microsoft and VXLAN by VMware, respectively. Scalability for future needs to simultaneously serve many user groups, higher I/O throughput and database transaction, easier maintenance and less effort for VM migrations and up to 20% reduced CPU utilization compared to software-based NVGRE or VXLAN are the outcome. The increased VM density maximizes general CAPEX and operational expenditures can be lowered due to a more efficient running system requiring less cooling.

Interface Card Overview



2x 1Gbit/s
DynamicLoM adapter



4x 1Gbit/s
DynamicLoM adapter



2x 10Gbit/s SFP+
DynamicLoM adapter



2x 10Gbit/s 10GBASE-T
DynamicLoM adapter*

Interface Card Feature Details

2x 1 Gbit/s DynamicLoM adapter

- IEEE 802.3ab
- RJ45 port
- Internet Small Computer System Interface (iSCSI)
- Wake-on-LAN (WoL)

4x 1 Gbit/s DynamicLoM adapter

- IEEE 802.3ab
- RJ45 port
- Internet Small Computer System Interface (iSCSI)
- Wake-on-LAN (WoL)

2x 10Gbit/s SFP+ DynamicLoM adapter

- IEEE 802.3ae
- Enhanced small form-factor pluggable (SFP+) port
- Internet Small Computer System Interface (iSCSI) optionally boot with full off-load
- Fibre Channel over Ethernet (FCoE) with full off-load
- Universal Multi-Channel (UMC)
- Remote Direct Memory Access over Converged Ethernet (RoCE)
- Single Root I/O Virtualization (SR-IOV)
- Wake-on-LAN (WoL)

2x 10Gbit/s 10GBASE-T DynamicLoM adapter

(available 11/2014)

- IEEE 802.3an
- RJ45 port
- Internet Small Computer System Interface (iSCSI) optionally boot with full off-load
- Universal Multi-Channel (UMC)
- Remote Direct Memory Access over Converged Ethernet (RoCE)
- Single Root I/O Virtualization (SR-IOV)
- Wake-on-LAN (WoL)

Conclusion

FUJITSU DynamicLoM technology is the solution for every need. It offers users the ability to individually adapt their current server network as well as the ability to change and thus meet future requirements without giving the server infrastructure a general overhaul. Starting at the initial system configuration, there is no standard connector implemented: the standard is the free selection of the available interface card.

Features like UMC and FCoE/iSCSI consolidate multiple adapters, switches and ports, dedicated storage adapters etc., resulting in lower total cost of ownership and security of long-term system value. The possibility to change the interface in future permits a state-of-the-art network scalability.

The superior feature-set and rich functionality all on one CAN chip makes DynamicLoM a truly dynamic solution without making any compromise.

Contact

FUJITSU Technology Solutions GmbH
Marcel Schuster
Heinz-Nixdorf-Ring 1
33106 Paderborn, GERMANY
Phone: +49-5251-525-2934
E-mail: marcel.schuster@ts.fujitsu.com
Website: www.ts.fujitsu.com/de
2014-11-26

© Copyright 2014 Fujitsu Technology Solutions GmbH. Fujitsu, the Fujitsu logo are trademarks or registered trademarks of Fujitsu Limited in Japan and other countries. Other company, product and service names may be trademarks or registered trademarks of their respective owners. Technical data subject to modification and delivery subject to availability. Any liability that the data and illustrations are complete, actual or correct is excluded. Designations may be trademarks and/or copyrights of the respective manufacturer, the use of which by third parties for their own purposes may infringe the rights of such owner.