Fault Tolerant Solutions

Continuous availability made easy

PROCESS CONTROL SYSTEMS

Stratus Solution

Complete hardware, software and services solutions designed to keep your applications running with no downtime or data loss.

Minimising planned downtime and avoiding unplanned downtime are key objectives for plant operators. Since server downtime is especially dangerous in a virtualised environment, server resilience is extremely important. There are various alternative virtualisation solutions on the market, however very few focus specifically on industrial applications and plant technology.
Stratus Fault tolerance ftServers are designed to deliver industry leading levels of application availability.

Alternative options to achieve high availability solutions involve clusters, or groups of servers, which require IT expertise to deploy and then diligently maintained. Not only is this option more complex to implement, it is also expensive and difficult to maintain. The fact that clustered servers are a reactive, not proactive form of availability means they deliver an inferior level of availability compared to a Stratus fault tolerant solution.

Understanding Virtualisation

For years the Information Technology (IT) world has been consolidating server hardware to improve hardware utilisation. Prior to the mainstream adoption of virtualisation, a single server or PC ran a single application, which often meant the hardware was vastly underutilised. In essence virtualisation allows one physical server to do the work of many servers.

By creating virtualised environments, customers are able to use a single physical server to run multiple operating systems and multiple applications. This is all possible by using a Hypervisor software layer such as VMware EXsi on the physical server that is designed to manage the virtual machines by separating and sharing them with the physical hardware resources.

Why it is important

The practice of using a software layer to let one physical server run multiple virtual machines has created many advantages. Some of the more common advantages are cost saving, hardware and application lifecycle management and faster deployments with virtual templates and snapshots.

With Manufacturers constantly adopting new software solutions to meet efficiency, quality and regulatory compliance goals, the need to rely on complex integrated IT solutions in production environments is constantly increasing.

In applications such as Manufacturing Execution Systems (MES), unplanned downtime can result in lost production and in more regulated industries loss of data and/or control can compromise the integrity of a batch records and require products to be destroyed.

While application consolidation has created significant benefits for industrial applications, significant risks exist when the underlying platform (including hardware, virtualisation software layer and drivers) are not sufficiently robust.

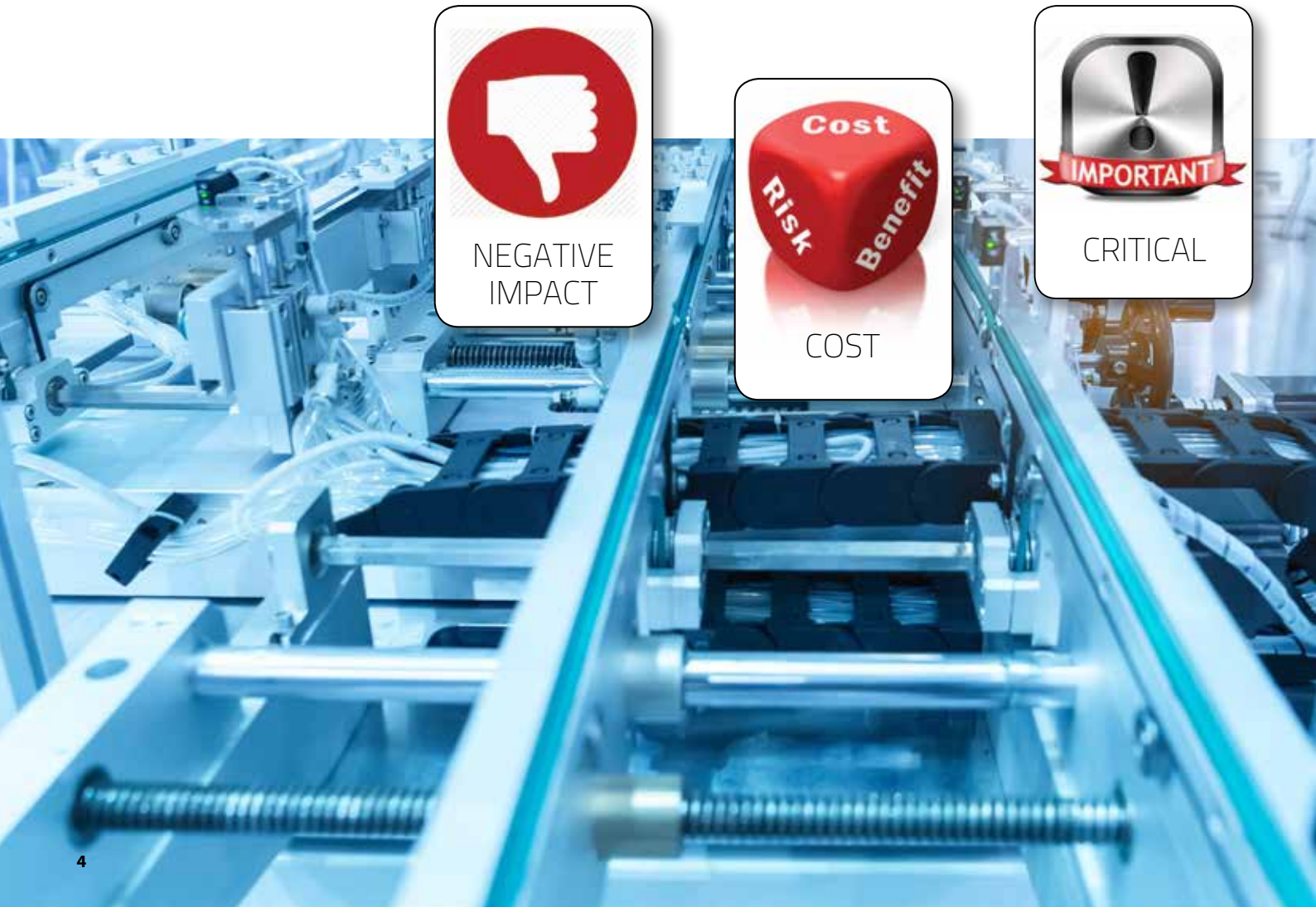
Virtualisation Risk

The benefits virtualisation offers provide clear examples of why companies in the industrial sector space are adopting the technology. But with the cost savings and efficiency of virtualisation comes significant risk.

When Industrial Control Systems (ICS) such as HMI and SCADA go down, technicians lose visibility into plant operations. Often when this occurs, operators need to revert to manually operating critical processes, which ultimately has a negative impact on efficiency and can introduce additional problems. For example, if a technician is unable to see levels of a tank and opens a value to release waste because a system has crashed, toxic spills could escape into the plant introducing risk to personnel. In addition to serious safety issues and blindness to plant operations,unplanned downtime leads to a number of other problems: process interruptions, data loss, regulatory and quality compliance challenges, and lost production all of which will result in lost revenue and potentially customer dissatisfaction.

Before virtualisation, when one server hosted one application, only one process stopped if a server was effected by a failure. But with virtualised servers running multiple applications, a hardware failure can negatively affect multiple processes.

The potential damage caused when multiple applications stop working simultaneously emphasises the criticality of a fault-tolerant platform when deploying a virtualised environment. While there are numerous high availability alternatives available to help protect a virtualised environment, only a fault tolerant solution can ensure uptime and mitigate the risk involved with bringing virtualisation into a plant. Fault-tolerance is the most important of the three pillars of virtualisation in a plant environment, although the other two—simplicity of management and ease of servicing—are also important for increasing efficiency while keeping costs in check.

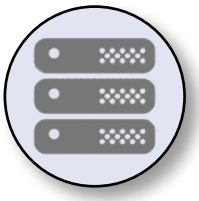


When it comes to fault tolerant solutions NHP offer three scalable options that are designed to meet the needs of standalone remote applications through to data-intensive or transaction-intensive applications.

The following Five key features help make ftServer easy to deploy, easy to manage, and easy to service:

Automated Uptime Layer

Unique to Stratus, redundant field programmable gate arrays, data paths, and lockstep firmware provide the processor synchronisation, data replication, and logic needed to ensure continuous availability, even in the event of a hardware component failure.



Single system with redundant hardware

Every single ftServer system is made up of two identical Customer Replaceable Units (CRUs) – each with their own processors, memory, and storage. All redundant components and subsystems are packaged as a single system, reducing licensing costs and simplifying management.

Industry standard components

ftServer uses the same chipsets, DIMMs, and drives, as those found in other industry standard x86 systems. It also uses a standard shrink-wrapped operating system and virtualisation software, for ease of management and faster time to value.

Active Service Architecture

By simplifying ftServer monitoring and management, and by filtering issues which require action, Stratus saves companies time and effort.

Hot swappable customer replaceable units

Without using special tools, automatic data re-synchronisation make ftServer suitable for deployment in remote manufacturing locations, or locations with limited IT resources

ftServer models

ftServer is easy to deploy, easy to manage, and easy to service. Three different ftServer models meet most every enterprise workload, environment, and budget.

SYSTEM	SUITABILITY
ftServer 2900 Affordability for stable, fixed standalone applications in remote offices, branch offices, or shop floor locations	Up to 5 virtualised applications*
ftServer 4900 Versatility for rapidly growing or evolving applications in regional offices, remote plants, or regional data centers	Up to 10 virtualised applications*
ftServer 6900 High performance for data-intensive or transaction-intensive applications in larger remote plants or corporate data centers	Up to 20 virtualised applications*

*Applications are a guide only

ftServer System Specifications	2900	4900	6900
Processors			
Processor(s)	1 x Intel® Xeon® Silver 4114 processor 2.2 GHz	2 x Intel® Xeon® Silver 4114 processor 2.2 GHz	2 x Intel® Xeon® Gold 6127M processor 2.2 GHz
Intel® Hyper-threaded Cores	10 per processor (10 per CRU)	10 per processor (20 per CRU)	16 per processor (32 per CRU)
Threads	20 per processor (20 per CRU)	20 per processor (40 per CRU)	32 per processor (64 per CRU)
Intel UPI speed	9.6 GT/s	9.6 GT/s	10.4 GT/s
Maximum memory bandwidth	76.8 GB/s	192 GB/s	192 GB/s
Memory			
Min/max memory	16 GB / 128 GB DDR4	32 GB / 512 GB DDR4	64 GB / 640 GB DDR4
DIMM slots	16 (8 per CRU)	40 (20 per CRU)	40 (20 per CRU)
I/O Subsystem			
Integrated PCIe® adapter slots	4 PCIe 3 x8 (2 per CRU)	4 PCIe 3 x8 (2 per CRU)	4 PCIe 3 x8 (2 per CRU)
Additional PCIe adapter slots	N/A	4 PCIe 3 x8 (optional) (2 per CRU)	4 PCIe 3 x8 (included) (2 per CRU)
Storage Subsystem			
Internal system drive bays	12 Gb SAS 2.5″ (8 per CRU)	12 Gb SAS 2.5″ (8 per CRU)	12 Gb SAS 2.5″ (8 per CRU)
Internal SAS disk drives	Please visit **www.stratus.com/ftserver/disks** for a complete list of supported disk drives		
ftScalable Storage Subsystem			
Expansion drive slots (RAID)	Up to 144	Up to 144	Up to 144
RAID levels	1, 5, 6, 10	1, 5, 6, 10	1, 5, 6, 10
Drive types	Please visit **www.stratus.com/ftserver/disks** for a complete list of supported disk drives		
Embedded I/O			
10/100/1000 Ethernet ports	4 (2 per CRU)	4 (2 per CRU)	4 (2 per CRU)
10 Gb Ethernet ports	N/A	4 (2 per CRU)	4 (2 per CRU)
10/100 Management Ethernet ports	2 (1 per CRU)	2 (1 per CRU)	2 (1 per CRU)
DVD-R/W	1	1	1
Serial (com) ports	2 (9-pin) ports per system	2 (9-pin) ports per system	2 (9-pin) ports per system
USB ports	4 USB 2.0 and 4 USB 3.0 (non-redundant)	4 USB 2.0 and 4 USB 3.0 (non-redundant)	4 USB 2.0 and 4 USB 3.0 (non-redundant)
Manageability			
Baseboard management controller	Standard	Standard	Standard
Virtual Technician Module (VTM)	Standard	Standard	Standard
Graphics adapter	1 VGA port per system	1 VGA port per system	1 VGA port per system

ftServer System Specifications	2900	4900	6900
PCI Adapters			
1 Gb dual-port Ethernet	Up to 4 optional (2 per CRU)	Up to 4 optional (2 per CRU)	Up to 4 optional (2 per CRU)
10 Gb dual-port Ethernet server adapter	N/A	Up to 4 optional (2 per CRU)	Up to 4 optional (2 per CRU)
12 Gb SAS 8-port host bus adapter for tape	Up to 2 optional (non-redundant)	Up to 2 optional (non-redundant)	Up to 2 optional (non-redundant)
16 Gb Fibre Channel for external storage	Up to 4 optional (2 per CRU)	Up to 4 optional (2 per CRU)	Up to 4 optional (2 per CRU)
Serviceability			
Hot-swappable components	CPU / I/O module, disks	CPU / I/O module, disks	CPU / I/O module, disks
Operating System*			
Microsoft	Windows Server 2016 with Hyper-V™ virtualization	Windows Server 2016 with Hyper-V™ virtualization	Windows Server 2016 with Hyper-V™ virtualization
VMware	vSphere 6.7	vSphere 6.7	vSphere 6.7
Red Hat	Red Hat Enterprise Linux 7.6	Red Hat Enterprise Linux 7.6	Red Hat Enterprise Linux 7.6
Power and Packaging			
Input voltage	100-127, 200-240 VAC; 50 Hz, 60 Hz	100-127, 200-240 VAC; 50 Hz, 60 Hz	100-127, 200-240 VAC; 50 Hz, 60 Hz
System dimension (H x W x D)	7.0″ (4U) x 17.5″ x 30.1″ with bezel	7.0″ (4U) x 17.5″ x 30.1″ with bezel	7.0″ (4U) x 17.5″ x 30.1″ with bezel
Weight (fully loaded including rails)	54.43 kg (120 lbs.)	54.43 kg (120 lbs.)	54.43 kg (120 lbs.)

*Consult your sales representative for specific OS availability.

ftServer options

Stratus offers a variety of certified options to easily extend your continuously available platform. From value added managed support plans, to modular storage—get the additional capabilities that you need, to satisfy your unique enterprise requirements.

ftServices

A variety of managed support plans and professional services are available to ensure your systems are up to date and operating at peak efficiency. You'll get the help you need, when you need it. Total Assurance, System Assurance, Extended Platform Support, and Platform Support managed plans are available for different applications, environments, and use cases.

ftScalable

Specifically designed to complement ftServer, NHP can offer hybrid storage array, to help you easily meet your growing storage needs, while also ensuring continuous availability and data integrity. Manage both hot and cold storage with real-time data tiering, and protect your sensitive data at rest with encrypted disk technology.

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