Milestone Solution Partner IT Infrastructure Components Certification Summary

Stratus Technologies everRun® Enterprise Downtime Prevention Solution

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About Stratus Technologies:

Stratus Technologies is a privately held company, owned by Siris Capital Group. The parent company, Stratus Technologies Bermuda, Ltd., is incorporated in Bermuda. Originally founded in the computer heydays of the 1980s as “Stratus Computer,” the company has been committed to the art and science of always-on computing from the start.

Stratus Technologies is the leading provider of infrastructure based solutions that keep applications running continuously in today’s always-on world. Stratus’ solutions enable the rapid deployment of always-on infrastructures, from enterprise servers to clouds, without any changes to applications. Our software and services solutions prevent downtime before it occurs and ensure uninterrupted performance of essential business operations.

Stratus’s everRun software prevents downtime and ensures business continuity and data integrity by keeping Windows and Linux applications up and running with mainframe like availability.

This all-in-one availability solution:

- Prevents downtime and protects your data in all your locations
- Enables you to achieve your business continuity plans
- Monitors applications and every component of your system, alerting you if a problem should arise, so you can take immediate action to head it off
- Offers built-in disaster recovery so you can get up and running faster than ever before
- Provides two levels of availability —fault tolerant and high availability

The solution is ideal for business-critical applications in any industry, in any size organization, and the network’s edge or in the data center. Visit www.stratus.com for more information.

About Milestone Systems:

Milestone Systems is the world’s leading provider of open platform IP video surveillance software. Milestone has provided easy-to-use, powerful video management software in more than 100,000 installations worldwide.

Milestone XProtect® products are designed with open architecture and are compatible with more IP cameras, encoders and digital video recorders than any other manufacturer. Because Milestone provides an open platform, you can integrate today’s best business solutions and expand what’s possible with future innovations. Visit www.milestonesys.com for more.
Introduction:

This report presents the results of benchmark, failure, and functionality tests performed on the Stratus everRun® Enterprise downtime prevention solution. This product was used as the primary management and recording server software platform for an XProtect surveillance system during this certification test. Test scenarios for the everRun solution focused on verifying the "downtime prevention" functionality of the solution by including twenty different simulated failure events. The Milestone Technology Partner (MTP) Certification program seeks to confirm that server, storage and network solutions provided by qualified MTP vendors meet the performance benchmarks required to support the Milestone XProtect VMS applications. In this particular situation, capacity testing focused on the ability of the everRun solution to withstand as many different individual points of failure as possible. Certification of the Stratus everRun solution will ensure that any surveillance system built using this product in combination with the Milestone XProtect components will be able to record and archive an amount of video consistent with the recommendations of the Milestone Server and Storage Calculator, and that the system will be able to withstand any of the failure events included in the test scenarios.

everRun Enterprise Architecture

The everRun Enterprise (eve) architecture consists of two physical servers, One application lives on two virtual machines, running in a fully protected Fault Tolerant (FT) mode. If one machine fails, the application continues to run on the other machine with no interruptions or data loss. If a component fails, it's automatically replaced with the healthy component from the second system. The I/O is automatically mirrored to the redundant server. Memory check-pointing ensures all in-flight transactions as well as data in memory and cache is preserved — without machine restarts. Again, if any failure occurs the application continues to run and be available to the clients without any interruption or recover process.

Certified Products

3 Stratus everRun - MTP Certification Performance Report
- Stratus everRun Enterprise
- Milestone XProtect Corporate 2014 (7.0c)
  - Stratus everRun solutions are certified for use with the entire XProtect product line.

Performance of the solution may vary if different XProtect products and/or system components not listed in the tests details are included.

**Solution Architecture:**

Two different topologies were used to support the full range of tests conducted during this certification. The system topology for the first test scenario placed all of the critical XProtect components within the PVM of the everRun Enterprise solution. Other surveillance applications, such as the virtual camera engine, and the XProtect Smart Client were hosted outside of the PVM. The second test scenario added the XProtect Smart Client to the everRun environment as a Windows 7 virtual machine also in fault tolerant protected mode. The Recording Server and the Management Server was maintained throughout the course of several failure events. The second scenario also increased the number of virtual camera engines required to increase the number of cameras from 25 to 92.

The specifications of the two servers used in this certification to support the Stratus evE PVM are listed here:

- HP DL360p Gen8 dual E5-2620-v2 6 core processors with Hyper-threading
- 32GB Memory
- Logical 558GB Disk (2 R1 300Gb Disk)
- 4 Network Ports
- 2 10Gb Network ports
**Performance Results:**

There were 20 different failure tests conducted during the certification. The XProtect Corporate active responding Recording Server and Management Server Virtual Machines were on different evE nodes, the active non-responding VMs were on the opposite nodes. Below is a loaded balanced environment.

<table>
<thead>
<tr>
<th>Name</th>
<th>Current PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>XPC-Record</td>
<td></td>
</tr>
<tr>
<td>SmartView</td>
<td></td>
</tr>
<tr>
<td>XPC-MgMt</td>
<td></td>
</tr>
</tbody>
</table>

In this example the active responding XProtect Corporate Recording Server is on "node-0" and the Management server was on "node-1." Logically the Milestone servers are one, and are seen as a single copy of the XProtect Recording server and Management server. Operators, users, and/or IP cameras connected all see a single server as they would in any other installation, fault tolerance is not apparent, it is transparent. Since evE is a failure avoidance FT solution any induced failure is completely transparent to the application and anyone or thing attached to the application server.

Physically, there are two copies of each application server running in "lock step", only one of the virtual machines is actually responding to requests, however the memory states, data... etc., are identical and in synchronization with each other (i.e. lock step). There were no failure events logged by the XProtect system, the recording servers registered zero lost frames during the test period, and there was no degradation in the performance of the surveillance systems operation.

**Key Findings:**

Stratus everRun was tested in twenty different failover scenarios, in two different architectural system designs, and with a video recording workload of both 24 and 92, one megapixel cameras. The Stratus everRun solution easily supported the benchmark number of cameras as indicated by the Milestone server and storage calculator, and the downtime prevention functionality of the solution was able to provide continuous system operation throughout all of the failure tests. The Stratus everRun Enterprise software product is a certified MTP solution. The performance of the Stratus everRun solution is listed below as averages across eleven failure benchmark test scenarios, and the average performance across all maximum performance failure tests for the everRun system is also listed.

<table>
<thead>
<tr>
<th>Test Scenario</th>
<th>Number of Cameras</th>
<th>Video Read Latency</th>
<th>Video Record Latency</th>
<th>Lost Frames</th>
<th>Recording Server CPU</th>
<th>Client CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benchmark Tests (11) – XProtect recording &amp; management hosted in everRun PVM</td>
<td>24</td>
<td>0.072 (ms)</td>
<td>1.21 ms</td>
<td>0</td>
<td>7.25%</td>
<td>3.23%</td>
</tr>
<tr>
<td>Maximum Performance Tests (9) – recording hosted in everRun PVM</td>
<td>92</td>
<td>2.83 ms</td>
<td>3.28 ms</td>
<td>0</td>
<td>32.48%</td>
<td>19.4%</td>
</tr>
</tbody>
</table>
The everRun Protected Virtual Machine (PVM) environment hosted the critical XProtect applications, such as the management and recording services, as well as the XPC Smart client and protected them against any type of failures which were introduced to the system. Examples of failures included:

- Crashed Recording Server Applications \(\leftarrow\) force active Recorder to other node (same as Mgmt. i.e. non-load balanced)
- Crashed Management Server Applications \(\leftarrow\) force active MgMt to other node (same as Recorder i.e non-load balanced)
- Full Server Crash \(\leftarrow\) stop active node
- Pulled Network Cables

The test results for the Stratus everRun Enterprise solution were impressive. This level of performance is exactly what we would want out of a solution which promises to minimize downtime. The XProtect Corporate VMS system operated within the everRun Enterprise PVM in exactly the same way that it would operate within any other compatible physical or virtual server system. What sets the Stratus solution apart from most other solutions however, is that their solution was subjected to over 20 different failure events and the operations of the XProtect VMS didn’t register a single failure event.

When an organization has video surveillance requirements which exceed 99.999% reliability, they will likely want to implement a downtime prevention solution which has been tested to support a video surveillance application. The certified Stratus everRun solution provides a continuous availability solution for Milestone Systems video surveillance product(s), mitigating the risk of lost video frames and unscheduled downtime due to physical, logical or virtual server component failures without the complexity of traditional cluster/multiple server recovery solutions.