



# Determining and Maintaining Consistent and Proper High Quality Operation In Large Complex Networks

- *Quality Assurance Automation*

*White Paper*

Version 1.0.3 January 2016

TITLE CustardWare White Paper	DRAWN BY 
----------------------------------	---

# Determining and Maintaining Consistent and Proper High Quality Operation In Large Complex Networks

## Abstract

In a large sophisticated network even a small amount of down time can have a major impact. Driving out failure and increasing resilience is therefore a major concern.

Simply monitoring for and responding to problems as they occur is too slow and inefficient to maintain a highly available environment. A more powerful technique is needed that helps to build in good practice, identifies faults and misconfiguration early, helping to remove sources of failure from the network on a continuous basis.

What is required are automated management reporting tasks and intelligent analysis tools that self deploy and flow around the network, identifying and helping to resolve issues before they become serious problems. They must be easily customised and centrally managed, and able to implement new levels of introspection as a demand evolves.

The system needs to be available for the customer to just use, and should require little or no configuration and the system should be supported in such a way that it provides no support burden to the customer.

## Introduction

For a large complex network environment, ensuring the best possible uptime is a difficult challenge.

Good design standards, perfect implementation and excellent monitoring will still not guarantee that the systems, networks and services that provide functionality will be available when required.

In fact it turns out to be a common feature of complex systems that failures increase in both number and severity as the total number of components increase. This is commonly recognised as a chain reaction and is evidenced by failures being driven by no single event but a combination of two or three coincident issues.

In large (often multi-site) networks where there is a high rate of change, either in components or configuration, failure rates increase further and can cause severe impacts, on both performance and availability.

Finally, few networks are new build, most have a large degree of legacy equipment, much of which is not easy to monitor and often prone to a higher age related failure rate.

Problems that have ongoing and complex interaction with other parts of the system cannot be determined in advance and no standard system of monitoring is able to cope with tracking, determining or resolving them. In itself network and system monitoring is inadequate.

This white paper looks at how **Higher Level Configuration and Operational Analysis** may be implemented and automated, outlining the benefits this brings to even relatively simple environments.

TITLE CustardWare White Paper	DRAWN BY 
----------------------------------	---

## The Management Problem

There are few networks, if any, that once configured stay exactly as they were designed. The forces of change such as expansion, failures, bug fixes, patches, upgrades, new services and administration have an unnerving knack of causing side effects, which often turn into periods of downtime.

In many companies parts of the server operation, network infrastructure or external network is handled by third-parties. Assisting them to understand the impact of failure and giving them a clear lead on where the problem lay is critical in keeping fault clearing times to a minimum and reducing downtime; thereby supporting service level agreements.

Supporting the requirements to maintain not just devices and networks but also end to end services, overall resilience and a wide range of protocols that underpin the operation of network systems is a continuous task.

Determining overall network and system health and capturing trend information is critical to the enterprise.

Monitoring service level agreements between the IT department and its customers as well as between the suppliers and the IT department becomes vital to maintain proper operation.

Traditional network monitoring might use two, or three or more proprietary system and network monitoring tools, however this often leaves many gaps. It also usually fails to detect subtle details such as services running slowly or failover between network links. Traditional monitoring also assumes that everything is in an ideal state with latest software patches and fixes implemented everywhere. Traditional monitoring cannot cope with many bespoke features in a highly customised environment.

There are many situations where understanding the operation of the network requires going beyond network monitoring and requires a way to determine correct overall function across a number of different, probably site specific levels.

The objective of this paper is to describe an approach that gives great flexibility and a wide range of methods for addressing the above problems in a way that is scalable and cost effective.

## Solution

In working with a large number of clients we realised early on that each customer was quite different. What would be important for one to keep operational would be less important for another. More importantly we saw that determining correct operation was often the summation of a number of separately monitored features. We also determined that there were some metrics we could measure that indicated the overall health of the network and systems. Finally we found situations in large multi-network environments where distributed probe based monitoring was required, firstly to spread load and secondly to cache activity during network failures.

This has evolved into a framework based concept that allows us to measure a wide range of high level concepts and network features. We have centrally controllable distributed probes that can run on secure wireless out of band networks able to provide feedback in the midst of a complete network or network link failure.

This has been deployed in a number of scenarios from high level application intelligence to controlled and automated decommission of network systems, as well as a sophisticated network health and user information system, in both static and mobile environments.

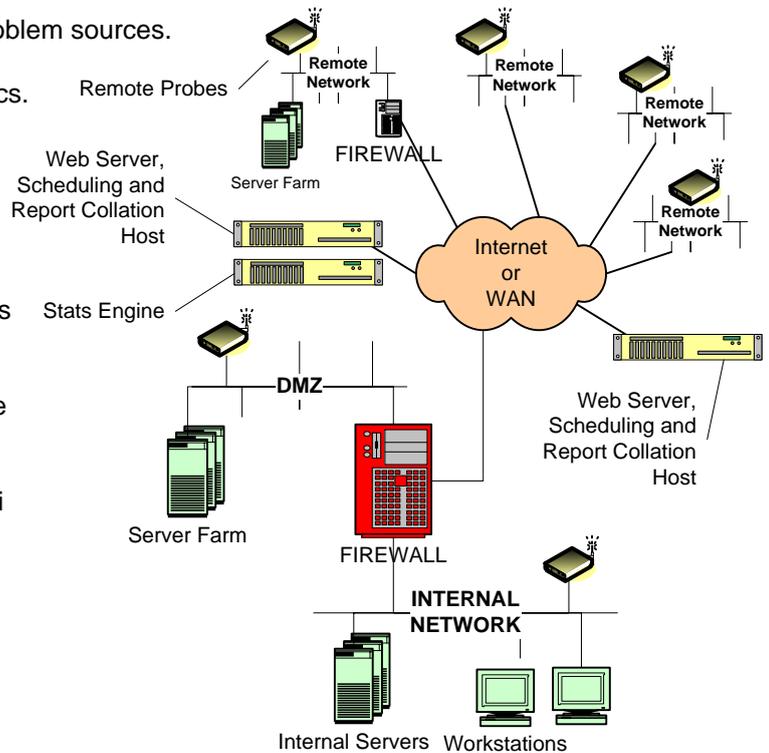
This allows us to rapidly implement new automated diagnostic tests or quickly deploy methods to gain configuration information, allowing us to respond quickly to evolving customer needs.

TITLE CustardWare White Paper	DRAWN BY 
----------------------------------	---

## Benefits

By developing a flexible response to a wide range of instrumentation problems we have produced a solution that has the following list of benefits.

- Reduces support costs by supporting faster problem diagnosis and early warning.
- Trend analysis and reporting gives clear picture of overall performance.
- Increases overall system/network uptime by reducing problem sources.
- Provides sophisticated means to measure network metrics.
- Provided as a fully managed service.
- Provides a broad basis for high level function and operation analysis.
- Eases technical staff's work load – allowing them to focus on solving problems.
- Extensible across large wide area networks using remote probes.
- Extensible to grow with your requirements including multi company.
- Designed to scale to give resilience and performance.



## Conclusion

The Abstract at the start of this note outlines how conventional monitoring is too slow and reactive for most modern high performance business critical networks.

Advantages can be gained by implementing a broad based system that monitors the existing monitoring systems, and gathers other high level information from systems and networks directly.

This gives rise to a higher level of network health and quicker operational assessment that reduces costs in support, giving quicker and more accurate identification of problems and reduced time to fix.

This increases the ability to match or exceed the SLA you are working to.

**Our trusted solution that provides great flexibility and high performance is based on a number of technical components that provide an overall framework, this smoothes out the sharp edges and makes developing solutions a much more pleasant experience... we have named it:**

## More Information...

If you would like more details of this product or would like to discuss arranging a demonstration please contact us on: **020 8769 4484**

Alternatively please see our web site:  
**[www.layer3.co.uk](http://www.layer3.co.uk)**



TITLE CustardWare White Paper	DRAWN BY 
----------------------------------	---