



NOMAD ENTERPRISE & WAN CACHING APPLIANCES

NETWORK OPTIMIZATION IN A
CONFIGURATION MANAGER 2007 ENVIRONMENT

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ABSTRACT: Describes how Nomad Enterprise compares to WAN caching appliances in a Microsoft Configuration Manager 2007 environment... Is there scope for both?

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Introduction

This document has been created to provide a more in-depth look into the methods used for transferring large amounts of SMS/ConfigMgr data across WAN links where there is no server at the remote office.

Nomad Enterprise is a well-established solution that has been specifically designed to work with SMS/ConfigMgr, optimizing the transfer of systems management data i.e. software applications, updates, patches and operating systems. It integrates two components, Nomad Branch® which distributes systems management data once over the WAN using intelligent bandwidth throttling and PXE Lite, which provides network booting capabilities without the need for branch servers.

By using bandwidth throttling and ensuring data is only ever copied once over the WAN, Nomad Branch reduces the need for servers to act as Distribution Points in branch offices. This not only reduces hardware and software costs of placing a server at these sites but also removes the administration overhead of managing these devices.

By providing network booting capabilities from a workstation, PXE Lite reduces the need for server-class hardware to support operating system deployments. It automates remote network booting, removing the need for user intervention and thus reducing the need for costly desktop site visits.

In recent years there has been a rise in WAN optimization technology and specifically WAN caching appliances. These appliances are generalized in their application as they look at all traffic passing over the WAN link, not just SMS/ConfigMgr traffic. They offer data compression as well as local caching of network packets, reducing the need for the same data to pass over the link.

Typically people would look at WAN optimization technology to address specific issues, for example a mission critical application that is suffering from network performance latency. In this instance, an organization could choose to spend money on upgrading their WAN link or to buy a WAN optimization appliance to make the link work smarter. What may be happening however is that performance is suffering because the link is being flooded when software deployments are taking place, and it is this area that Nomad Branch has been specifically designed to address.

Some examples of manufacturers providing WAN caching appliances include:

- Riverbed – Steelhead
- Juniper Networks – WXC Framework devices
- Cisco – WAAS
- Expand Networks - Accelerator
- Bluecoat – ProxySG

Although the overall objective of these appliances and Nomad Enterprise is the same i.e. to reduce the amount of traffic going across the WAN, they do it in very different ways.

The Technology

WAN Caching Appliance is probably a bit of a misnomer for these devices as they are not necessarily just about caching data. Most of these devices are actually WAN Optimization devices and their primary objective is to optimize network traffic to remote sites.

Depending upon the specific appliance there is a range of functionality available, ranging from WAFS (Wide Area File Services) which provides optimization at the file level, right up to advanced devices such as Riverbed's Steelhead technology which is a Wide-area Data Services (WDS) appliance and is designed to optimize and accelerate all TCP traffic.

If we look at a WAFS solution then this works purely at a file level; essentially when a remote user requests a file, it passes through the WAFS appliance and a copy of this file is stored within the local cache. The next time this file is requested either by the same user or another user then the copy is retrieved from the cache and passed to the users rather than passing across the expensive WAN link again.

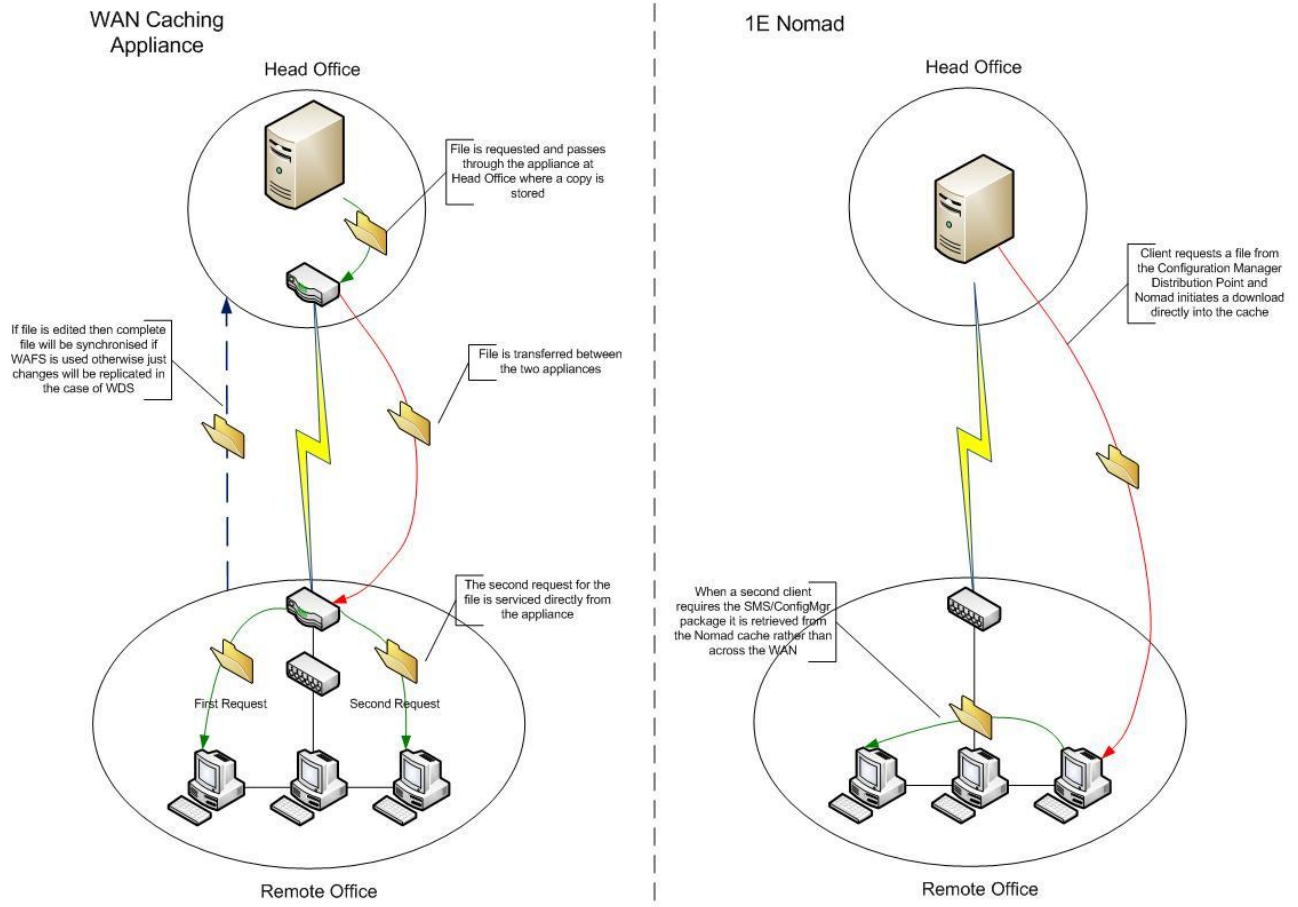
A WDS solution looks beyond the file level and is instead looking at the data-stream (whatever it may contain). It recognizes and caches data patterns. The appliance itself controls the TCP communication over the WAN link and transparently spoofs this information to the clients so that they think they are talking directly with the source. If we take the previous example with a user downloading a file then this would get cached as a specific pattern in the device and can be served again to the second user without crossing the WAN. The big difference here is when a change is made to that file either at the source or by the end user. A typical WAFS solution would need to transfer the entire file, whereas the WDS solution utilizes the part of the pattern that remains the same and just transfers the changes. This makes it a great solution for continually changing data and dramatically reduces the amount of traffic that passes across the WAN.

One factor that is common between both WAFS and WDS is that there is a limited amount of storage available upon the appliance. Therefore the more traffic that passes through the appliance the quicker the older files and data patterns are rolled out of the cache storage. This means that if data is continually being changed i.e. documents being edited, and applications accessed such as email, then these solutions will perform well at optimizing the WAN traffic. However if a particular file had not been accessed for a couple of weeks then it would be very unlikely to still be in the cache. A WAFS device would have to transfer that file across the WAN again and a WDS device is likely to have to transfer the majority of that file again. There is no way of controlling what is in the cache and how long it stays for, it is purely limited by the size of the disk in the appliance.

Nomad Branch works very differently from these appliances. Whereas an appliance moves the data efficiently and quickly it does not make allowances for other traffic on the link that is not being managed by the appliance itself. An appliance also attempts to pass the data across the link as fast as possible, whereas Nomad Branch is moving data that does not have a real time requirement. Nomad Branch moves the data efficiently and at the same time is aware of other traffic on the WAN link and can control its data flow accordingly.

Nomad Branch is optimized for SMS and Configuration Manager environments and will download data from a Distribution Point when an application is advertised to that client. It will download the advertised files in a controlled manner across the WAN link, continually analyzing other traffic on the link and reducing its data flow so as not to flood the link and cause issues with other business critical applications such as VOIP or media streaming. These files will be downloaded into a local cached folder and then made available for other clients on the subnet to avoid the need for the same data to pass across the WAN link.

Unlike with WAN appliances, with Nomad Branch the cache can be controlled and retained. Take the example of an application deployment such as Microsoft Project; this is an application that is used by a few people at a remote site and over the course of the year, various other users at that site have a requirement for it. When a package is deployed using Nomad Branch it can be configured so that it is retained in the cache in preference to other applications that may have been deployed afterwards. This means that each time there is a requirement for it you can be certain that it is already at the remote site and will not have to be downloaded again because too much time has elapsed and the cache has been flushed.



Another component of Nomad Enterprise is PXE Lite. This provides remote bare-metal boot services, enabling full OS deployments to take place in sites with no server infrastructure to provide the boot service or host the image file for deployment. This specialized functionality, for automating OS deployments, cannot be achieved with a WAN Optimization appliance.

Benefits and Downsides

One thing to consider when looking at solutions to control WAN traffic is that both Nomad Enterprise and WAN Caching appliances both have their place in an infrastructure. They have both been designed with a specific objective in mind and as such they should not be considered mutually exclusive. Just purchasing a WAN Optimization device will obviously have a positive effect on SMS/ConfigMgr traffic in the short term. But, it does not address the real issue of getting large packages to a site and retaining this to avoid the same data traversing the WAN link the next time the same deployment needs to take place. Neither does it address the issue of requiring a server based solution at a remote site to provide network boot services to clients that have no operating system installed.

Let's have a bit of a look at the pros and cons of each solution:

WAN Caching Appliance

- Pros:
- Reduces total WAN traffic
 - Handles non-SMS/ConfigMgr traffic
 - Optimizes bi-directional traffic
 - Supports centralized virtualization (only some appliances)
- Cons:
- Expensive
 - Single point of failure
 - Makes no allowance for non-managed traffic on the WAN link
 - SSL support lacking in many devices (no good for Native Mode ConfigMgr)
 - Cache content cannot be controlled and data that has not been accessed for a few days is unlikely to remain in the cache

Nomad Enterprise

- Pros:
- Specifically designed for SMS/ConfigMgr
 - Supports SSL traffic
 - Cache can be controlled and retained
 - Dynamic failover
 - Controls its bandwidth use based upon other traffic on the WAN link
 - Content can be delivered during periods of low WAN utilization (i.e. overnight)
 - PXE Lite services supported for bare metal deployments
- Cons:
- Cannot control non-SMS/ConfigMgr traffic
 - Content control one-way only

Note: Both Nomad Enterprise and WAN Optimization appliances compress network data. This looks amazing during WAN Optimization demonstrations; however this has neither been considered a positive or a negative within this document. On the whole, systems management data is compressed already e.g. compiled files, Windows Installer MSI files, and OS images. There is no benefit to be found in compressing data that is already compressed.

Using Nomad Branch with WAN Caching Appliance

As the two solutions have different design goals, when used together they complement each other well; however they must be configured correctly. This section describes Nomad Branch configuration options to ensure efficient network usage. Changes to PXE Lite configuration are not required.

If Nomad Branch is running through the WAN appliance then it becomes more complex for it to assess the bandwidth and work out the true WAN link speed. When the transfer starts we expect it to be remote; however this particular data pattern may have been accessed recently so the WAN appliance services the blocks directly from its cache, giving the impression of a very fast link. We then continue copying the file until we hit some new blocks which need to be pulled down from the remote site meaning the perceived line speed drops dramatically.

To ensure that Nomad Branch works effectively in an environment using WAN Caching Appliances there are two configuration options that should be considered. These allow Nomad Branch to cope with these perceived massive variations in bandwidth. If not configured properly, Nomad Branch may detect this as a line failure, at which point the dynamic failover kicks in and a new master is elected to continue the download and the cycle starts again.

Option 1

The preferred option would be to configure the WAN Caching Appliance so that all SMB traffic between the SMS/ConfigMgr Distribution Points and the clients at the remote site is not optimized, passing straight through the appliance as if it were not there. Other network traffic will continue to be optimized. This has the following benefits:

- No “double-caching” occurs
- Nomad Branch can correctly assess the bandwidth it is operating across
- Nomad Branch will be aware of the traffic passing between the two appliances and back-off accordingly

Option 2

If Nomad Branch traffic is to be managed by the appliance the same as all other traffic then there are some Nomad specific options that need to be configured to avoid the conflicts. Nomad Branch continually evaluates the available end-to-end link speed and will dynamically back off to ensure other network traffic is not impacted. To ensure this on-going bandwidth tuning reflects the true link speed, rather than an optimized one, set the following:

- **AssumedLinkSpeed** – Set this to ensure the initial ping based link speed calculation reflects the true value, rather than an optimized one.
- **MaxAllowedLinkSpeed** – Set this to define the maximum WAN speed. This ensures Nomad does not try to re-tune itself to the speed of the LAN.

Where multiple sites are involved, with different capacity WAN links, then the values above can either be tuned per site or set globally. If setting globally, then choose the lowest common denominator i.e. if there are a number of sites that range from 2Mb to 10Mb connections then these values should be set to 2Mb.

Conclusion

The most important thing to take from this document is that Nomad Enterprise and WAN Caching Appliances cannot and should not be compared on a like for like basis. They were designed to do different tasks and the features and benefits they provide are appropriate to each task.

Both solutions have their own sweet spots and complement each other well. Just using a WAN Optimization device will reduce the bandwidth consumed during a single mass SMS/ConfigMgr deployment of an application. However if this deployment is staggered over a period of time, which is a more likely scenario, then this data will be pulled repeatedly over the network due to the appliance cache rolling out old data.

Using both together gives a well-rounded and comprehensive solution to maximize the efficiency of WAN links with each element playing to its strengths:

- General TCP and file traffic optimized (WAN Appliance)
- SMS/ConfigMgr package delivery optimized (Nomad Branch)
- Bare-metal client build services provided (Nomad Branch / PXE Lite)

WAN Optimization devices do not fully address the requirements of ConfigMgr package deployments, so if this is a primary objective then look to Nomad Enterprise to provide most benefit to the infrastructure.

About 1E

1E believes every one of our customers should expect more from their IT. Founded in 1997, 1E is recognized as a leader in software and services that improve IT efficiency by identifying and reducing costs and waste in hardware, software, energy and time.

1E pioneered advanced PC power management with the release of ground-breaking solutions like NightWatchman® and WakeUp™. That innovative approach has continued with the development of revolutionary concepts like Useful Work™, Drowsy Server®, Computer Health™ and Shopping™ as part of a unique range of industry-leading solutions.

Headquartered in London and New York and with 14 million licenses deployed world-wide, over 1,100 organizations in 42 countries have trusted us to help them to work effectively, productively and sustainably. To date, we have helped our customers save in excess of \$530m in energy costs alone, reducing their electricity consumption by 5.6 million megawatts and cutting CO₂ emissions by 4.3 million tons.

About Nomad Enterprise

Nomad Enterprise uses your spare network bandwidth to reliably deliver large operating system deployments and patches across thousands of PCs, servers and sites without disruption, removing the need for branch servers and desk-side administrator visits.

Nomad Enterprise integrates two components, Nomad Branch® which distributes systems management data once over the WAN and PXE Lite, which provides network booting capabilities without the need for branch servers.