Determining how many web servers are needed

This is a general guide-line on how to determine the number of web servers needed on a ViconNet system to support the web based viewers and / or the mobile based ones.

The number of servers required to support a certain system's needs is determined by a few key factors and their impact on the amount of processing required from the server. The higher the processing requirements are, the more servers will be required in order to provide constant, high quality service to all concurrent devices asking for video. These are the parameters that need to be considered:

Web clients, mobile clients or both

Streaming video to standard web browser clients (H.264 for the most of it) has been done by the server since the web viewer has been released 2 years ago, this has not changed. Streaming to mobile devices requires video transcoding to MJPEG and requires a much more processing power from the web server.

Camera resolution

Cameras with a resolution of up to 2MP (1080P) can be sent directly to the standard web viewer transcoding while resolutions over 2MP require transcoding even to the web viewer. In addition when mobile devices are being used, the resolution has a direct impact on the server's processing power.

Existence of a 2nd, lower resolution stream

This parameter is the most significant one in the design. Most of the IP cameras have the ability to be configured with a 2nd stream at a lower resolution than the first one (this has always been Vicon's recommended setting as it allowed displaying more cameras in split screen modes). When this stream is available, the web browser will use it for the split screen pictures (both web and mobile) which will control the processing required thanks to that lower resolution.

Cameras with MPEG4 compression

Former versions of the web viewer did not support MPEG4 video streams (due to a Microsoft Silver Light limitation). With the new version, these are supported by transcoding them into MJEPG even for the web viewer. This means that systems using MPEG4 based cameras need to design as if there are mobile devices used even if there are truly only web viewers

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Follow these steps in order to determine how many web servers are needed and in what configuration to set them up to achieve an optimal design.

DO YOU NEED TO SUPPORT MOBILE DEVICES OR JUST THE STANDARD WEB VIEWER?

DOES THE SYSTEM HAVE CAMERAS OVER 2MP IN RESOLUTION THAT **DO NOT** HAVE A 2ND LOWER RESOLUTION STREAM?

DOES THE SYSTEM INCLUDE MPEG4 BASED CAMERAS?

If the answer to **all** three questions is **NO**, you may use the current performance specs below:

Web server running in the Nucleus:

Up to 10 Concurrent web viewers

Stand-alone web server:

Up to 25 concurrent web viewers

* if multiple stand-alone servers are used, set the Nucleus as to load balance mode.

> If the answer to any of the questions above is **YES** you need to proceed and use the table below to estimate the required number of web servers:

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➤ For mobile and web combined, when the server is running on the Nucleus, it can support up to 8 concurrent streams to a mobile devices, Vicon <u>strongly recommends</u> using a stand-alone web server instead of the one in the Nucleus.

➤ If wireless networks or internet is being used, you need to ensure sufficient bandwidth exists on those in order to support all streams.

➤ Concurrent streams are the total number of video streams **actively** sent to all mobile devices at any given time (you may have multiple mobile devices but if only one is used a time, it is just its streams that you need to account for).
  o Multiple cameras on the same device, each camera is a separate stream
  o Same camera to different devices, each one is a separate stream

➤ If cameras higher than 2MP (with no 2nd lower stream) or MPEG4 based ones are being used by web viewers, those are counted as mobile streams.

| Resolution H.264 based cameras @ 30 fps	Number of concurrent streams supported by a single web server	Estimated bandwidth per stream from server to client	Additional web viewers supported by same server
D1	35	~ 2Mbps	15
720P and 1.3MP	20	~ 3Mbps	12
1080P and 2MP	12	~ 3.5Mpbs	10
3MP	8	~ 3.5Mbps	8
5MP	5	~ 3.5Mbps	6

Important notes:

➤ If all cameras **have** the second stream at D1, only the first row can is used. And the base performance of a single server is very cost effective.

➤ Additional servers can always be added to increase overall performance. By using the Nucleus in a load balance mode, the user only need to connect to its address and it will then utilize all servers for optimal performance.

➤ Using a lower FPS in the camera does not offer a significant saving of resources (the transcoding process is still demanding).

➤ A storage calculator for the above is being developed to allow an easier design process.

Best practice system design:

- A separate Nucleus with the web server set to run as a load-balace server (this means it is no longer a web server but only a traffic cop balancing the load between the available stand-alone web servers)

- Stand-alone (or multiple) web server to support the required number of concurrent web and mobile clients.

- The web and mobile viewer will always connect to the Nucleus address which will optimize the load between available servers (this is done automaticaly and in a transparent manner).
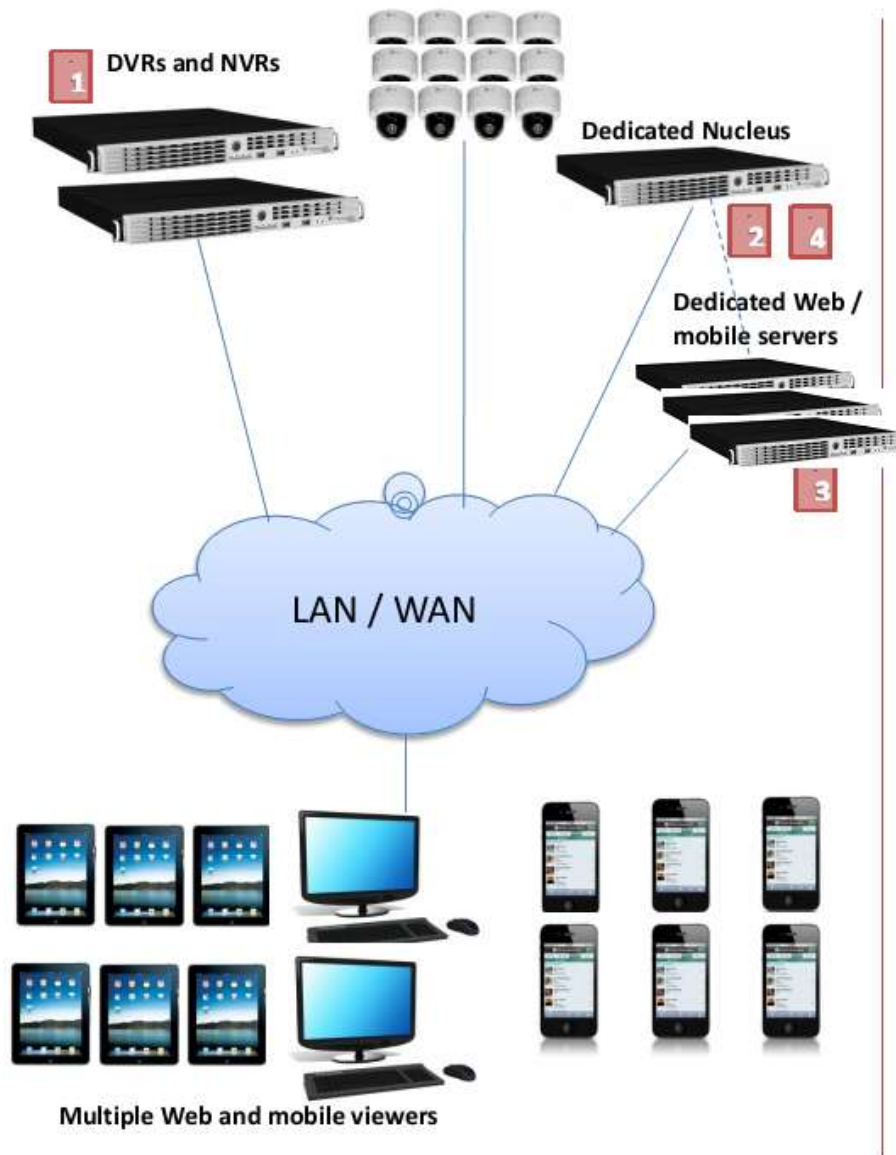
- ❖ Additional design examples are in the Vicon mobile system white paper

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