CORTORL Hardware Calculator

v1.1.0

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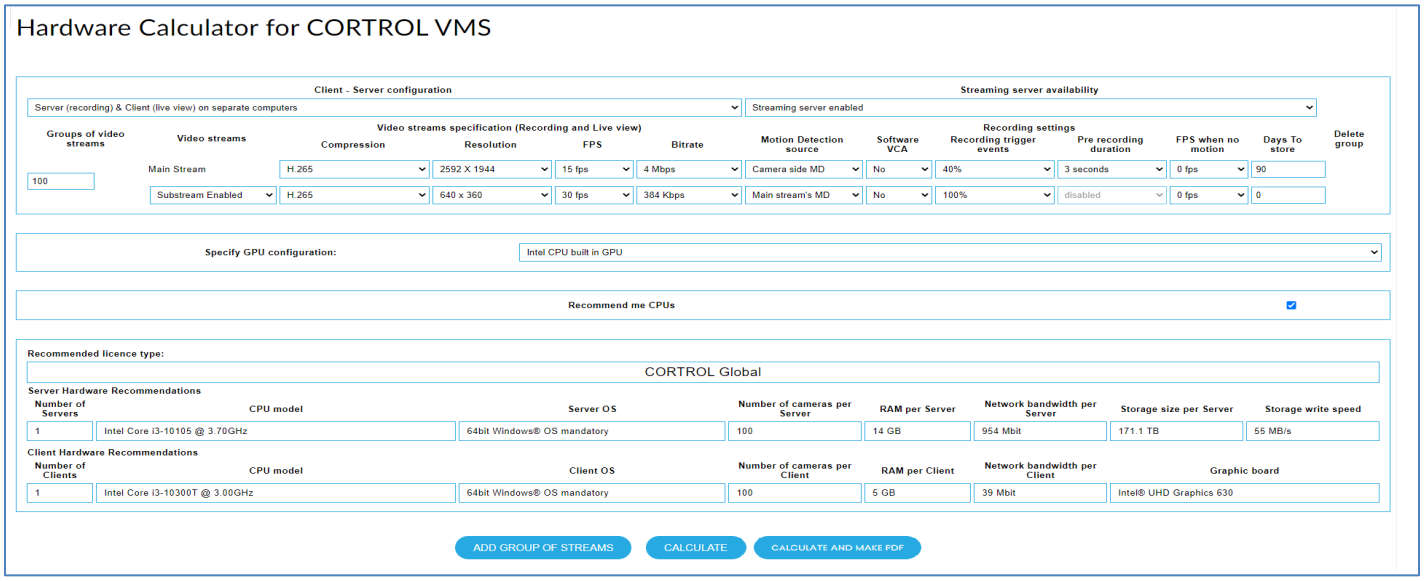
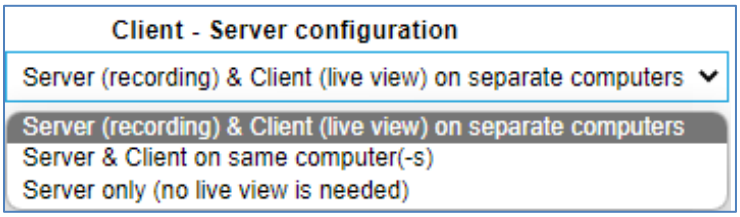
To calculate as accurately as possible, the hardware requirement of a CORTROL Recording Server, it is recommended to use the CORTROL Hardware Calculator.

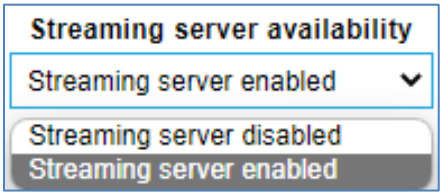


The CORTROL Hardware Calculator has the following components.

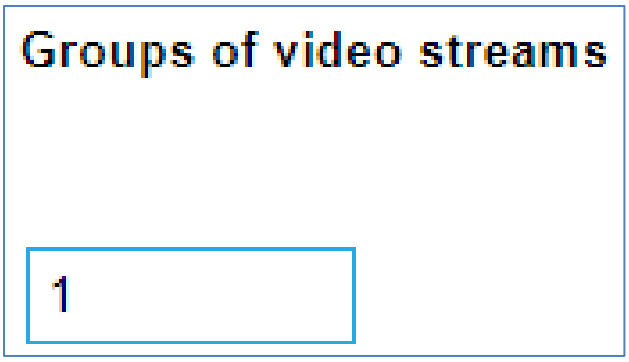
1. Client-Server configuration: Designate were the CORTORL Client will reside.
   - Server & Client on separate computers *(Best deployment – Most recommended)*
   - Server & Client on same computer *(Requires higher spec due to shared resources)*
   - Server only *(Server dedicated resources, similar to "Server & Client on a sperate computer")*



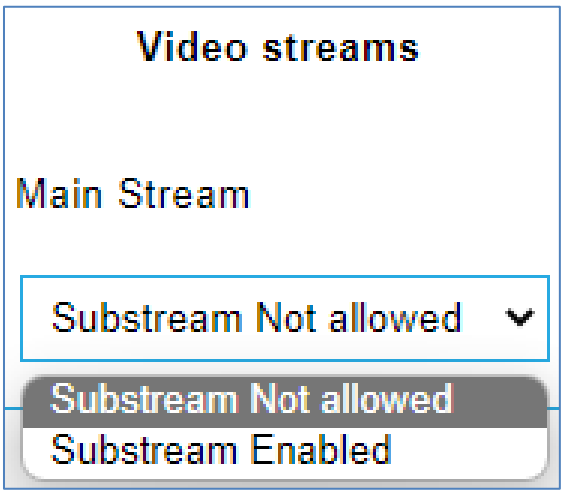
2. Streaming server availability: Designate if the Streaming Server is enabled/disabled.
   - Streaming server disabled *(Disabled – No Web browser, nor Mobile app supported)*
   - Streaming server enabled *(Enabled – Web browser, and Mobile app supported)*



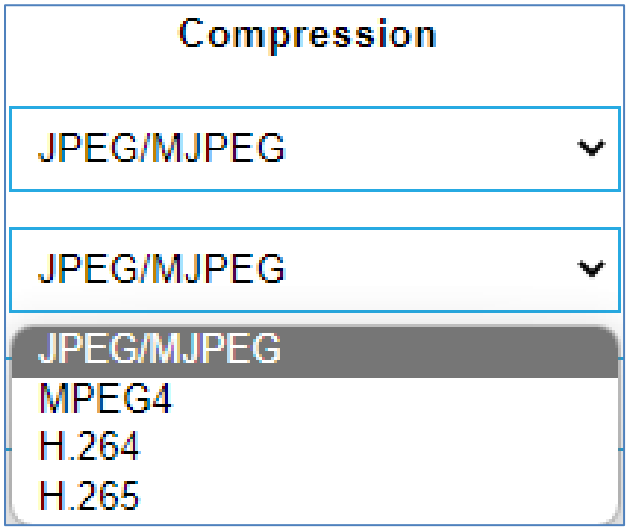
3. Group of video streams:
    - Designate the number of like cameras (Same resolution, FPS, Bitrate etc.)
    - Enter the quantity of cameras: 1 ~ 10k
        - Example: Quantity of 10, 2.1MP (1920x11080) resolution cameras
        - *Please select "Add Group of Streams" in order to add the next group of cameras*
            - *Example: second group of cameras are 24, 5MP (2592 x 1944) resolution*



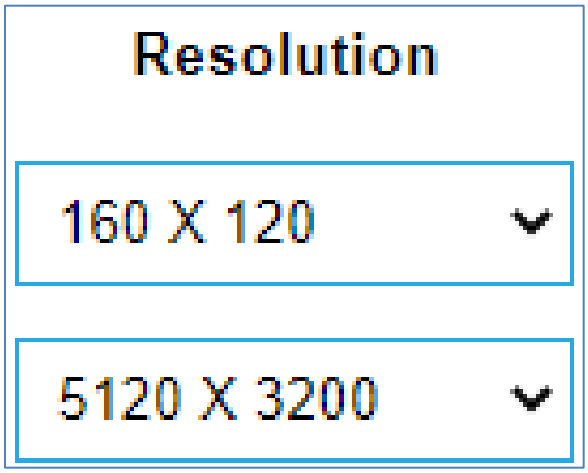
4. Video streams:
    - Analog / AHD / TVI
        - Older DVRs and encoders may only offer a high-resolution, or mainstream
        - Newer DVRs and encoders offer both a mainstream, and optionally a substream
    - IP cameras support multi-streaming *(Mainstream, Substream, and a potential 3rd stream)*
        - Mainstream: The primary high-resolution stream *(No modification possible)*
        - Substream: Options are "Substream Not allowed" / "Substream Enabled"
            - *It is recommended to enable the substream, in order to capture the hardware impact of monitoring a multi-channel layout in the CORTROL Client*
            - *Recording of the substream is not required for this recommendation*



5. Compression:
   - The compression supported by the camera, DVR, or Encoder to encode the video stream
   - Be sure to check the supported compression of the IP camera, and recorder prior to use
   - Select the compression, per the expected recording requirement and device supported
     - JPEG/MJEP
     - MPEG4
     - H.264
     - H.265



6. Resolution:
   - Refers to the resolution(s) supported by the IP camera, DVR, or Encoder in use
   - Expected resolution to be recorded by CORTROL coming from the camera, DVR, encoder
   - Select the expected resolution
     - 1st Resolution: Support for 160x120 ~ 5120x3200
     - 2nd Resolution: Note - if substream is enabled, select the target resolution



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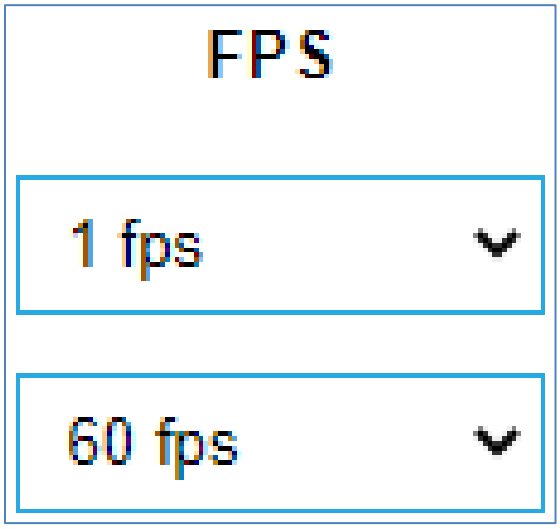
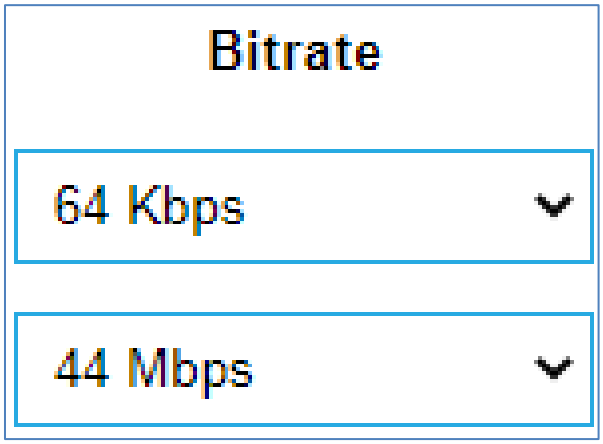
1. FPS:
    - Related to the frames per second of the video stream being Viewed/Recorded by CORTROL
        - 1st FPS: Supports 1fps, 3fps, 5fps, and then in increments of ten: 10fps ~ 60fps
        - 2nd FPS: Note - if substream is enabled, select the target FPS



2. Bitrate:
    - Related to the bitrate setting within the IP camera, DVR, and or Encoder
    - This is the size of the data of the video stream pulled into CORTROL
    - **Bitrate Estimate:** Auto calculated based on Resolution + FPS selection
        - Can be manually entered to reflect scene simplicity, or complexity requirement
        - 1st Bitrate: Supports 64Kbps ~ 44Mbps
        - 2nd Bitrate: Note - if substream is enabled, select the target device bitrate



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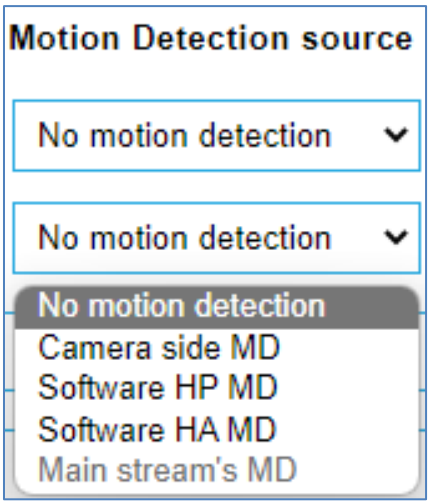
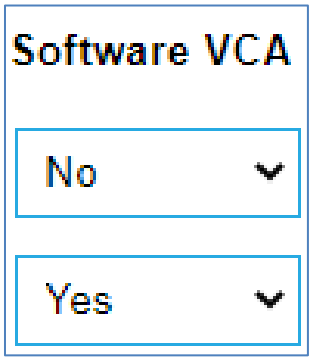
Examples of average, or a typical bitrate based on resolution, and frame rates per second

Label	Resolution	Res Index	30IPS / BR	15IPS / BR	7IPS / BR
D1	704x480	0.34	0.8	0.4	0.2
0.46 MP	960x480	0.46	1.1	0.6	0.3
0.9 MP	1280x720	0.92	2.2	1.1	0.5
2.1 MP	1920x1080	2.07	5.0	2.5	1.2
3 MP	2048x1536	3.15	7.6	3.8	1.8
5 MP	2592x1944	5.04	12.2	6.1	2.9
6 MP	3072x2048	6.29	14.8	7.4	3.4
8MP	3264x2448	7.99	19.4	9.7	4.5
12MP	3648 x 2736	9.98	24.2	12.1	5.6
Average bit rates listed. High activity, may require higher bit rates					

3. Motion Detection source:
    - Related to the application of a motion detection scene
        - Source of either camera side, or server-side motion detection
    - **No motion detection:** No motion detection required, disabled
    - **Camera side MD:** Camera side motion detection enabled *(Camera motion zone configured)*
    - **Software HP MD:** Server-side high performance-based motion detection enabled
        - *Attempts to balance resources, offering a moderate impact on server performance*
            - Reference the CORTROL Administrative manual for HA motion detection
    - **Software HA MD:** Server-side high accuracy-based motion detection enabled
        - *Requires a high amount of server resources, impacting server performance*
            - Reference the CORTROL Administrative manual for HA motion detection
    - **Main stream's MD:** Substream reflects setting of mainstream detection select



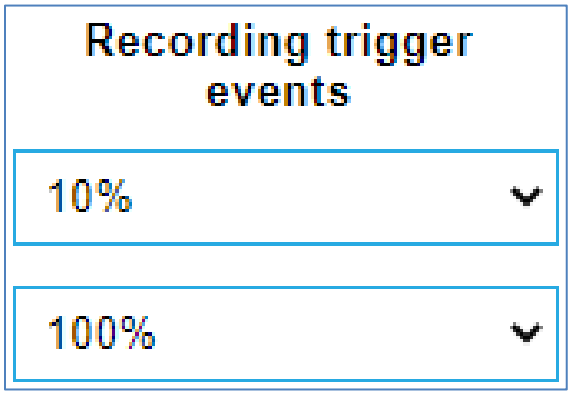
4. Software VCA:
    - Related to CORTROL Premier, and CORTROL Global Recording Server based CVA analytics.
        - 1st Stream: No *(Disabled)* / Yes *(Enabled)*
        - 2nd Stream: No *(Disabled)* / Yes *(Enabled)*



5. Recording trigger events:
    - Triggered events maybe motion detection, analytic, or even server event triggers
        - 1st Trigger: Select 0 ~ 100 percent *(100% equals continuous recording)*
        - 2nd Trigger: Select 0 ~ 100 percent *(100% equals continuous recording)*

Motion detection-based recording: Motion estimated percentage chart below

- Note: 100% daily motion estimate is equal to one 24 hour day



Motion Percentage Break down.						
24 hours	Percentage					
1	100%	75%	50%	25%	12.50%	4.16%
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
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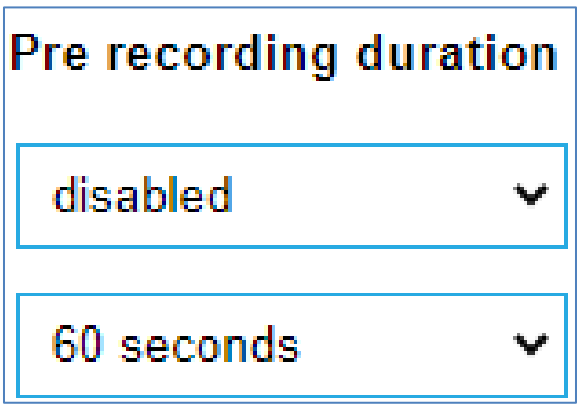
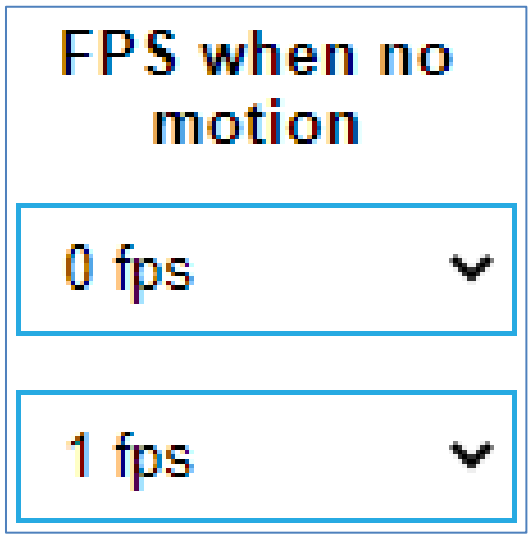
6. Prerecording duration:
    - Pre-motion buffered video data, related to camera and or server enabled motion detection
    - A typical deployment site default is 3 ~ 5 seconds of premotion video recording
        - 1st Pre-recording: Disabled ~ 60 Seconds (Recordable amount of buffered video)
        - 2nd Pre-recording: Disabled ~ 60 Seconds (Recordable amount of buffered video)

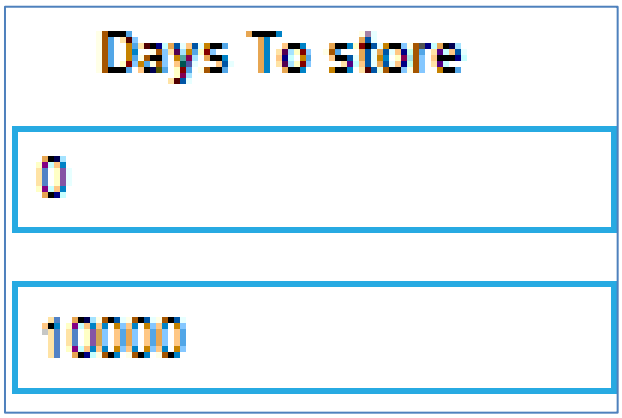


7. FPS when no motion:
   - Related to the frames per second to record upon absence of any motion detected
   - Typically used to offer visual confirmation of stream being live, and no change in scene
     - 1st FPS: 0, 0.1 ~ 1 in increments of a tenth of a second
     - 2nd FPS: 0, 0.1 ~ 1 in increments of a tenth of a second

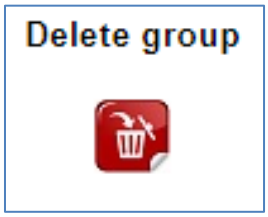
   - *Recommended for use with camera resolutions of 2.1MP (1920x1080) and below*
   - *Not recommended for use with greater than 2.1MP (1920x1080) due to impact on storage*
     - *Use substream with constrained FPS, and Bitrates for minimum impact on storage*



8. Days to store:
   - Related to the required days of retention as per the application requirement
     - Mainstream: Select 0 ~ 1,825 days for retention
     - Substream: Select 0 ~ 1,825 days for retention
       - *Set substream to 0, if used to measure impact on hardware only*
       - *Set to greater than 0 if recording as alternate to absence of motion detected*

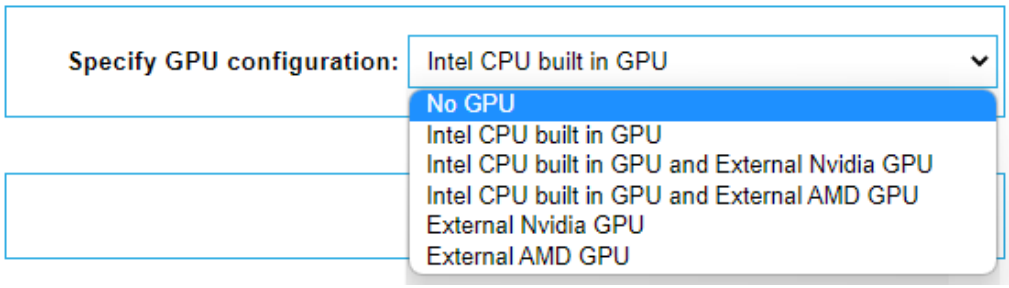


9. Delete group:
   - Related to removing an added group of cameras, in addition to the default first group
     - Select "Delete group" for the group of cameras to be deleted from the calculation.

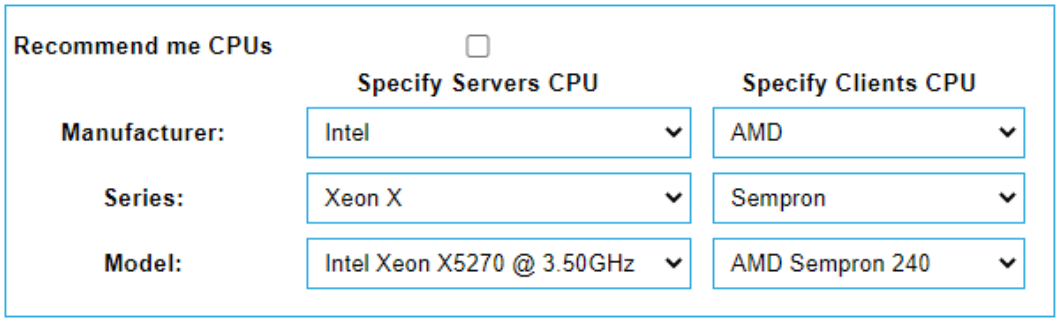


10. Specify GPU configuration:
    - Entry level Ganz ZNR servers utilize an "Intel CPU with built in GPU"
    - Entry level ZNR servers, select "Intel CPU built in GPU"
    - Raid based ZNR servers, select "Intel CPU built in GPU and External AMD GPU"
      - In most cases, ZNR Raid servers include an AMD based GPU

    - Customer servers, select the appropriate GPU selection, Intel, Nvidia, or AMD



11. Specify Server CPU:
    - Related to calculating the Server and Client CPU required to meet hardware calculations
    - Recommend me CPUs: Leave checked if looking for a recommended CPU spec
    - Recommend me CPUs : Uncheck in order to set a target CPU spec
      - Specify the Server CPU: Select either Intel or AMD
      - Specify the Client CPU: Select either Intel or AMD
      - *Typically used if existing hardware is available*



12. Intel CPU Index: Order of performance with lowest CPU performance at top, highest at bottom
    - AMD CPU index not currently available

CPU Index	Cores	Threads
Intel Celeron G5905	2	2
Intel Pentium G6400	2	4
Intel Core i3	4	8
Intel Core i5	6	12
Intel Core i7	8	16
Intel Core i9	12	24
Intel Xeon (Dual CPU)	20	40

13. Add Group of Streams: Adds a new camera group below the default first camera group.
    - Select for each group addition as required.

14. Calculate: Upon completion of changes to the CORTROL Hardware Calculator, select "Calculate" to get a Server, Storage, and Client recommendation.

15. Calculate and make PDF: Upon completion of changes to the CORTROL Hardware Calculator, select "Calculate and make PDF" to generate a PDF of the calculated results.

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Example of a full Hardware Calculation