cloudastructure

*Optimize your
Cloudastructure System*

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V1.0

INTRODUCTION

This pre-deployment scoping document is intended to provide Cloudastructure clients with the tools to ensure the correct expectation for the performance of the CSI system given their budget or other constraints.

For help by phone, please contact: +1-650-644-4160 and ask for Technical Support

Optimize Your Cloudastructure System
Deployment considerations

To ensure a successful implementation of your Cloudastructure AI surveillance system, you need to consider critical factors that can impact operations. This summary document gives you the tips needed to plan for your system ahead of time and optimize settings for a variety of deployment scenarios and goals.

Object Detection and Recognition

The security industry used Pixels to define how much detail a viewer sees in an image. The higher the pixel count, the higher the resolution.

In general, several types of detection requires camera/image recognition:

- **Motion detection**: being able to see that some activity is going on, such as a person approaching a lobby entrance or a car entering the garage.

- **Classification:** being able to tell general features of a subject, such as color and type of clothes or items, make and model of a car, and ethnicity and gender of a person, for example.

- **Recognition:** identify details and provide positive identification of a subject. Facial features, brand logos on items, and license plate numbers are some of the examples.

The larger focal length makes the field of view of your security cameras narrower and the objects seem to be bigger and closer to the camera, i.e. you would be able to detect/classify/recognize objects that are farther out. Higher camera resolution likewise helps you improve on the distances that the system can efficiently operate at.

Other factors, such as lighting, glare, motion, and angle, among others, will affect the camera's ability to capture a clear image. On the other hand, a single clean image would be sufficient to classify or recognize an object.

Special Considerations for Facial Recognition

- To provide reliable facial recognition, cameras need to be mounted at egress points at face height, approximately 5' 6". Vandal-proof dome cameras are recommended.
- Facial recognition will be impacted when cameras are placed higher than that. For example, a 10 ft placement allows the cameras to see only the foreheads of individuals which would limit effectiveness.
- Facial recognition may be impaired if faces are obscured by headgear, sunglasses, or masks. Conversely, prescription glasses will generally not interfere with facial recognition.
- Be aware of potential tension between achieving reliable facial recognition vs the need to protect your camera investment. Lower placement may allow vandals to tamper with the cameras, such as by obscuring the field of view or destroying them altogether.

Bandwidth

Bandwidth requirements per camera are highly variable and depend on the amount of motion (i.e. percent of the time the camera would be recording and uploading a video), camera resolution, frames per second setting, and lighting conditions. The amount of motion can be the easiest variable to control with proper camera mounting. For example, a camera looking out a front door at a busy street will be viewing motion all the time, whereas the same camera pointing into the building may view a fraction of that amount of motion. However, sometimes there are high-motion scenes that need to be captured (e.g. people walking through a turnstile in a busy transit system)

The below table offers ballpark estimates based on motion and camera resolution while keeping frames per second (fps) constant at 15. Fifteen fps offers smooth motion while preserving bandwidth, vs full frame rate at 30 fps.

Upload bandwidth recommended (Mbps) PER CAMERA *

	Motion (percent)
	50
1080p	1.9
4 MP	3.7

*These estimates assume H.264 encoding.

Nominal bandwidth recommended (Mbps) at Scale *

	Camera Resolution/Frame Rate 50% Motion	
	1080 P	4MP
10 cameras	19	37
20 cameras	38	74
50 cameras	95	185

*Backbone traffic expected for a group of cameras @ 50% Motion

Additional considerations:
- The above numbers are dedicated bandwidth, not shared with other cameras nor other systems.
- When using live monitoring, bandwidth requirements can increase by 4 or 5 times for the cameras that are being used for live view. It is recommended if increasing live monitoring that customers may notice latency issues.
- The more motion you have in live view the more bandwidth is required. The increase in the overall bandwidth for live viewing is tied to the amount of time that the viewing is on.

When planning for your Cloudastructure system, nothing replaces your knowledge of your environment and foot / vehicular traffic that would typically be seen on camera. Please share your observations with the Cloudastructure team to ensure success. Additionally, Cloudastructure is developing a tool to evaluate bandwidth requirements depending on activity level for typical environments.

Night-time Operation

Most crime and vandalism occurs at night and regular street lighting is usually inadequate to deliver clear surveillance footage, which is often needed to provide evidence for judicial purposes. We recommend active night illumination for key entrances, gates, or other points of interest, to improve both the physical safety of your employees / guests / residents, and more efficient performance of your surveillance and analytics platform.

Note that night-time object classification or facial recognition with the Cloudastructure system requires active scene illumination or Near Infrared (NIR) cameras. Far IR (body heat) cameras

are not currently supported for object detection or facial recognition. However, they can still be used for video recording and live view.

Uninterruptible Power Supply (UPS)

It is important to consider all infrastructure when deploying security surveillance systems. One area often overlooked in the design and implementation is electrical power stability. Cloudastructure stores recordings in the cloud which allow for superb protection against power loss once the recordings have been transferred, care must be taken to ensure that the CVR and network are protected in order to continue uninterrupted recording and transmission. This would include protection of the following onsite infrastructure components:

1. CVR
2. LAN Switches and Routers
3. Internet Connectivity

Many calculators are available to determine the load and length in order to properly size the UPS. Operationally these units often provide a warning (audible or internet) to notify on outage and service replacement of failing batteries.

Moving Forward

This document is provided to help you plan your security initiatives and cannot substitute professional advice from technical experts. Have questions? Please contact your account manager or sales@cloudastructure.com for further information or to discuss your project.

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