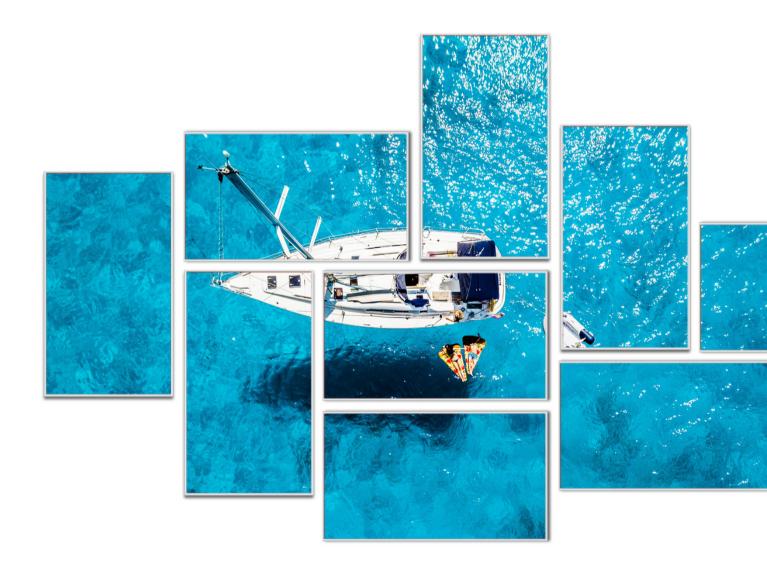# videri

CONTENT & CONNECTIVITY

Best Practices Guide

About this guide

This guide will help you achieve the best performance from the Videri Digital Canvas. In this guide, users will find technical information that, when followed as recommended, will optimize how the Canvas displays content and communicates with the cloud. As such, this guide serves as a useful reference for IT professionals and content designers alike.

Contents

1 Connectivity Best Practices

To function, the Videri Digital Canvas must be connected to both a Wi-Fi network and the Videri cloud. In this chapter, we cover necessary prerequisites for setting up Canvas communications.

1.1 Connecting to your WIFI

We support the following SSID encryption modes:

- WEP (64)
- WEP (128)
- WPA-PSK (TKIP)
- WPA-PSK (AES)
- WPA2-PSK (TKIP)
- WPA2-PSK (AES)
- WPA2-Enterprise using RADIUS

The use of certificates or authentication via a landing and/or sign-in page is **NOT** supported.

Recommendations

- Your Wi-Fi network should have a password.
- There should be no metal beams or concrete walls between the Canvas and the access point (AP). For the best experience, please have the Canvas in line of sight to the AP.
- Your Canvas should be on its own network and should **NOT** be on a network that is used by guests.
- All Canvases should always have -70dbm or better signal strength. We recommend WPA2-PSK (AES) security for the best network speeds. Once connected to the Videri cloud, you can review network signal strength by accessing your Videri user portal.

1.2 Bandwidth requirements

Once content is downloaded to a Canvas, the Canvas can remain online and in sync on as little as 200 kb/s. When combined into a Wall, Canvases will download content simultaneously, requiring higher sustained downstream bandwidth.

Please note that the type and size of content needing to be downloaded will impact bandwidth requirements. A weak Wi-fi signal will result in download retries and congest the entire network. Ensure that your network infrastructure can handle multiple, parallel connections of the network load or consider a dedicated AP for Canvases or multiple APs.

For a Canvas to properly report screencapture to the Portal, we recommend an additional 10Kbps bandwidth per Canvas. Larger installations needing sync should consider higher bandwidth upstream connections.

1.3   Connecting to the cloud

All cloud-based network communications are initiated by the Canvas. A routable or static IP address is **NOT** required.

Canvases use the following **outbound** ports and protocols:

TCP Protocol	Port(s)	DNS
HTTP	TCP 80	Any. Your Canvas can contact public websites as part of normal signage operations. DNS will depend on content.
HTTPS	TCP 443	
XMPP	TCP 5222, 5223	msg.videri.com
ICMP	ICMP	
NTP	UDP 123	The following NTP pools will be contacted: time.nist.gov 0.android.pool.ntp.org 1.android.pool.ntp.org 2.android.pool.ntp.org 3.android.pool.ntp.org 0.us.pool.ntp.org 1.us.pool.ntp.org 2.us.pool.ntp.org 3.us.pool.ntp.org **NOTE**: Each pool contains 1000s of individual servers with specific IPs (Ingress Protection). It is required to whitelist the NTP protocol rather than individual IPs.

2 Content Best Practices

When working with content, keep in mind:

1. Active display area of the Canvas
2. Supported file format for content
3. Minimum required resolution for content
4. Orientation of the Canvas

Please note that while Videri Canvases can stream content, we cannot guarantee playback and sync for URLs. For the best content experience, we recommend only scheduling content that has been properly ingested into the cloud.

2.1 Active display area

The table below provides the active display area for different Canvas models.

Canvas	Display area (inches)	Display area (millimeters)
Spark5	42.28" x 23.78"	1073.8 x 604
Spark4	37.05" x 20.84"	941.18 x 529.42
SparkQ+	23.47" x 23.47"	596.16 x 596.16
Spark3	27.5" x 15.47"	698.4 x 392.85
Spark2	16.1" x 9.06"	408.96 x 230.04

2.2 Image guidelines

The table below provides guidelines for uploading images to the cloud.

File format	PNG*, JPG, JPEG
Max file size	5 GB
File compression*	Enabled
Data type	24-bit, RGB color space
Minimum required resolution (in pixels)	SparkQ+: 1920 x 1920
	Spark 2, Spark3, portrait: 1080 x 1920 Spark2, Spark3, landscape: 1920 x 1080
	Spark4, Spark5, landscape: 3840 x 2160 Spark4, Spark5, portrait: 2160 x 3840

* For lossless compression, we recommend uploading images in PNG format.

2.3 Video guidelines

The table below provides guidelines for uploading videos to the cloud.

File format	MP4
Max file size	5 GB
Recommended resolution (in pixels) * *The resolution noted here is our recommendation to achieve the best display quality for video content.	SparkQ+: 1920 x 1920
	Spark 2, Spark3, portrait: 1080 x 1920 Spark2, Spark3, landscape: 1920 x 1080
	Spark4, Spark5, landscape: 3840 x 2160 Spark4, Spark5, portrait: 2160 x 3840

Video guidelines, continued—

Video specs	
Codec	H.264, Main Profile
Bitrate*	10-30 Mbps
Frame rate	30 fps
Chroma format	4:2:2
Audio specs	
Codec	Multi-channel PCM – 48 kHz 16-bit, Stereo (Little Endian)
Audio channels / streams (2.0 stereo)	Ch. 1 – Left, Ch. 2 – Right
Audio channels / streams (5.1 stereo)	Ch. 1 – Left, front Ch. 2 – Right, front Ch. 3 – Center, front Ch. 4 – Low frequency Ch. 5 – Left, back Ch. 6 – Right, back

* Our system supports both constant and variable bitrate. When using variable bitrate, if you find video is freezing or stuttering, reduce the maximum variability.

> **NOTE**: B-frame compression is not supported.

Recommended video format:

Spark2, Spark3	1080p H.264 Main Profile @ 30fps, constant bitrate, 10-30 Mbps AAC 22hHz stereo @ 112 kbps
Spark4, Spark5	UHD H.264 Main Profile @ 30fps, constant bitrate, 10-30 Mbps AAC 22hHz stereo @ 112 kbps
SparkQ+	1920-square H.264 Main Profile @ 30fps, constant bitrate, 10-30 Mbps AAC 22hHz stereo @ 112 kbps

3 Walls Best Practices

A Wall is a group of Canvases that function in tandem to act as a video wall.

3.1 Content synchronization

The values in all tables in this section were measured after the RMS value of error on ntpd was under 1ms using Wi-Fi within the operating parameters described in Chapter 1.

3.2 Sync tolerance

The system currently supports frame-level accuracy for multiple screens showing videos. Sync tolerance for videos is 30ms ± 7ms.

Additional bandwidth-related parameters to consider:

Latency	Our system will function correctly with packet delay of up to 1 second.
Jitter	Packet jitter over 500ms on a normal distribution will produce ± 15ms desync between Canvases. This will cause a delay of approximately 1 frame.
Packet Loss	Our system will function normally up to 15% packet loss. 50% packet loss will produce a permanent offline status. Units will lose sync over a period of 24 hours at 50% packet loss.

3.3 Transition tolerance

Transitions between content items are measured in terms of error-in-milliseconds between multiple screens.

Transition	Transition tolerance
Image → Image	16ms ± 16ms
Image → Video	16ms ± 16ms
Video → Image	16ms ± 16ms
Video → Video	16ms ± 16ms