

Affordable, Windows-Compatible Edge Signage — Departments Own the Content

Project Overview

One-line takeaway: Departments control their own displays by logging into Zoom Rooms to upload media or add URLs; the Raspberry Pi 5 + BVM + Windows 11 ARM stack provides an affordable, Windows-compatible endpoint for cloud-managed digital signage.

Purpose: Deliver a low-cost, energy-efficient digital signage solution that runs Zoom Rooms Digital Signage on Windows 11 ARM inside BVM on a Raspberry Pi 5, enabling decentralized content ownership with centralized delivery.

Core Components



Raspberry Pi 5

Host device that boots the OS and auto-launches the VM viewer to drive HDMI output; ideal for continuous, low-power 24/7 digital signage.



BVM (Botspot Virtual Machine)

Lightweight QEMU/KVM wrapper on ARM that boots a Windows 11 ARM qcow2 image with UEFI, and manages VM lifecycle and fullscreen display.



Windows 11 ARM Virtual Machine

Runs the Zoom Rooms Digital Signage client and Windows apps. CrowdStrike endpoint protection inside the VM provides enterprise EDR, telemetry, and policy enforcement.



Zoom Rooms Digital Signage

Cloud-managed platform for scheduling, playlists, templates, and device grouping. Devices receive content and schedule updates from Zoom's management console automatically.

Deployment & Content Management

Provisioning: Scale by deploying identical Pi images or scripted installs; BVM auto-loads the Windows image at boot for unattended operation.

Departmental Content Control: Departments log into Zoom Rooms with organizational credentials to create and schedule content. Editors upload media, add URLs, build playlists, set schedules, and assign devices or groups. Content changes propagate from Zoom's cloud to Pi endpoints automatically — no local access to the Pi or VM required.

Operational Roles: IT handles device provisioning, security (including CrowdStrike management), monitoring, and image maintenance. Departments manage content and schedules through Zoom's web console.

Supported Media Types & URL Content

Images

JPG / JPEG and 24-bit PNG supported. Recommended resolution 1920x1080 for full-screen clarity. Keep files under ~15 MB for reliable uploads and display performance.

Videos

MP4 (H.264), MOV, AVI, WMV supported. H.264 MP4 is recommended for best compatibility and performance on ARM hardware. Keep files ≤ 1 GB and prefer 720p–1080p resolution for smooth playback.

Web Pages & URLs

Add any web page or web app as a playlist item so the device displays live web content in rotation. Use responsive pages and avoid heavy client-side processing to ensure smooth rendering on the Pi endpoint.

Best Practices

Transcode video to H.264 MP4; optimize images for screen resolution; host dashboards or interactive content on lightweight, responsive web pages when using URL playlist items.

Benefits, Maintenance & Support

Cost Efficiency

Raspberry Pi 5 hardware is significantly cheaper than dedicated commercial signage PCs, reducing upfront and replacement costs.

Energy Efficiency

Low, continuous power draw makes the Pi 5 ideal for 24/7 display operation without significant energy overhead.

Windows Compatibility

Full Windows signage tools, drivers, and enterprise security agents like CrowdStrike are supported via Windows 11 ARM running inside the VM.

Cloud Management & Roles

Zoom Rooms provides role-based access so departments independently manage content while IT retains full device control and provisioning authority.

Scalability & Recovery

Image-based provisioning and Zoom device grouping simplify large rollouts. Maintain a golden qcow2 and SD card image for rapid device replacement.

Monitoring & Security

Standard monitoring tracks device health and connectivity. CrowdStrike provides endpoint detection and response, policy enforcement, and centralized telemetry for security operations.