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1. Introduction

Provide developers and support with the information needed to deploy, configure, and diagnose BlazorVideo and its attached media boxes.

Assumes .NET 8, Blazor Server; describes how InventoryOS's DigitalSignage component on the kiosk instructs the "Media Boxes" to open the correct BlazorVideo URL for streaming.

Prerequisites:

- Host OS (BlazorVideo server): Windows Server or Windows 10/11
 - .NET: .NET 8 Hosting Bundle
 - 7-Zip CLI (server): 7z.exe installed at one of:
 - C:\Program Files\7-Zip\7z.exe
 - C:\Program Files (x86)\7-Zip\7z.exe
 - Network Ports:
 - TCP 7207 (BlazorVideo SignalR & page)
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2. System Overview

BlazorVideo comprises:

- Blazor Server App
 - Hosted as a Windows service named BlazorVideo on the central kiosk server
 - Renders a <video> tag in client browsers
 - Uses SignalR (PlaybackHub) for synchronized playback
- JavaScript Interop
 - mediaPlayerInterop for video operations
 - heartbeat for page-visibility heartbeats
- SignalR Hub
 - PlaybackHub broadcasts state changes and coordinates multi-screen readiness
- Services
 - PlaybackService (IPlaybackService): manages per-group playback state and leader election
 - AdvertisementHandler: loads, caches, and validates AdvertisementsSchedule.json, watches for changes

- InventoryOS on the Kiosk
 - At startup, its DigitalSignage component reads DigitalSignageConfig.json and issues commands to each Media box over SSH to open a browser pointed at the BlazorVideo URL for its assigned group and screen index
 - ManageIqBoxDS
 - GUI for merch mode to view and adjust group/index settings in DigitalSignageConfig.json on the kiosk
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3. Installation & Configuration

3.1 BlazorVideo Server

1. Deploy the service:
 - Installs as a Windows service named BlazorVideo (e.g. `sc create BlazorVideo binPath= "C:\InstantDVD\Advertisement\blazorvideoapp\BlazorVideo.exe"`).
2. Install prerequisites:
 - Ensure .NET 8 Hosting Bundle & 7-Zip CLI are installed on the server.
3. Configure network:
 - Open TCP 7207, UDP 4000, TCP 4001, and HTTPS 443.

3.2 Kiosk & IQ-Box Configuration

- DigitalSignageConfig.json (on the kiosk)
 - Path: `C:\InstantDVD\Misc\Storage\DigitalSignageConfig.json`
 - Defines the IPs of each IQ box and its assigned group/index. Example:
 - Updated via the ManageIqBoxDS GUI; backed up as `AdvertisementBackup\DigitalSignageConfig.backup.json`.
 - InventoryOS DigitalSignage Component
 - On kiosk startup, reads the above JSON and for each entry:
 1. Opens a TCP/UDP connection to the IQ box at `IpAddress`.
 2. Sends a command (`OpenUrl`) that includes the BlazorVideo base URL, group ID, and screen index.
 3. The IQ box's local startup script or service (outside of InventoryOS) then launches its browser to that URL.
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4. JavaScript Interop

- initialize (isProduction, dotNetRef)
Registers beforeunload and pagehide to call UnregisterMeAsync on disconnect.
 - log (level, message)
Prepends a timestamp; routes to console.info, console.warn, or console.error.
 - setSrc(videoElement, src, deviceId, groupId, force = false)
 1. Fade opacity
 2. Normalize URL; avoid redundant reloads
 3. Attach canplay and ended handlers
 4. Invoke ReportOnPlaying when ready
 - play (videoElement, connectionId) & playWhenReady(videoElement, time)
Mute then play; wait for metadata if needed.
 - heartbeat.isPageVisible()
Returns document.visibilityState === 'visible'.
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5. Blazor Components

MediaPlayerComponent

- Parameter: GroupAndScreen (group ID + optional screen index)
- OnAfterRenderAsync(firstRender):
 1. Sets up dotNetRef
 2. Initializes JS interop
 3. Opens SignalR connection
- Event Handling:
 - PlaybackStateChanged
 - AssignRole (leader election)
 - Triggers PlayWhenReady

Multi-screen Coordination

- Leader Election: via AssignRole; only leader advances state
 - Readiness Reporting: clients report via hub; when all ready, hub advances to next ad
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6. Service Layer

- PlaybackService
 - Holds in-memory PlaybackState per group (ads list, current index/time)
 - Methods: StartPlayback, HandleMediaEnded, GetCurrentStateAsync
 - Manages leader/client state with concurrent collections and semaphores
 - AdvertisementHandler
 - Loads & validates AdvertisementsSchedule.json
 - Caches results; watches for file or directory changes
 - Triggers ScheduleChanged; maintains a backup JSON for restoration if needed
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7. Service Lifecycle & Update Mechanism

1. InventoryOS finds Media boxes reportin and starts its lifecycle.
 2. Service is automatically reinstalled if new tar.gz exists.
 3. Media Box Browser Launch:
 - InventoryOS on the kiosk checks DigitalSignageConfig.json on startup and issues OpenUrl commands so each Media Box browser navigates to the correct BlazorVideo URL.
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8. Operation & Maintenance

- Logging:
 - Server: InstantDVD.QuickLog("BlazorVideo")
 - InventoryOS: InstantDVD.QuickLog("DigitalSignageManager")
 - Health Monitoring:
 - Configure Windows service recovery for BlazorVideo to auto-restart on failure
 - JS heartbeat pauses playback when page hidden and drops client
 - Cache & Cleanup:
 - AdvertisementHandler clears expired ads based on the defined schedule
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9. Support & Troubleshooting Guide

Issue 1: Service Fails to Start

Symptom: The BlazorVideo Windows service is not running or won't start.

Resolution:

1. **Verify** that C:\InstantDVD\Advertisement\blazorvideoapp\BlazorVideo.exe exists.
 2. **Confirm** that the .NET 8 Hosting Bundle is installed on the server.
 3. **Ensure** 7-Zip CLI (7z.exe) is installed in one of the expected locations or on the system PATH.
 4. **Inspect** the Windows Event Viewer on the kiosk for any service-startup errors.
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Issue 2: Media Boxes Don't Show Video

Symptom: Client browsers launch but display blank screens or errors instead of video.

Resolution:

1. **Validate** that DigitalSignageConfig.json on the kiosk lists each Media-Box's correct IP address, Pi ID (Piid), group ID, and screen index.
 2. **Confirm** the InventoryOS DigitalSignage component is running on the kiosk and issuing OpenUrl commands to each IQ-Box.
 3. **Check** that TCP 7207 (SignalR) are open in firewall.
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Issue 3: Advertisements Don't Update

Symptom: Old ads continue playing; new content never downloads.

Resolution:

1. **Verify** that Advertisement.tar.gz has been uploaded to the server's ROOT\Advertisement folder.
 2. **Inspect** AdvertisementsSchedule.json for valid JSON syntax and correct timestamps.
 3. **Reset** the AdvertisementTS value to 0 in the client configuration to force a full resynchronization.
 4. **Make sure** that the advertisement is created for the correct endpoint and operator. Check the web2 server.
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Issue 4: Playback Out of Sync

Symptom: Multiple screens are not synchronized in playback.

Resolution:

1. **Ensure** all Media Boxes intended to play the same content share the identical group ID in DigitalSignageConfig.json.
2. **Confirm** that each client browser has reported readiness via the SignalR hub before advancing playback.