Scope of Works – CornerPins
OBS RTSP Streaming Infrastructure

Objective
Deploy a high availability live streaming system across 24 lanes of a tenpin bowling centre using 12 PoE IP cameras and NVIDIA powered mini PCs to encode and stream 12 RTSP feeds to YouTube. Incorporate advertisement triggers, central web based configuration and infrastructure for cable routing and power resilience.

Hardware Components

Cameras (12 Units)
- Model: Reolink RLC-830A
- Specs: 4K UHD PoE, Audio
- Quantity: 12
- Placement: One per lane pair (24 lanes total)
- Cost Estimate: $180 × 12 = $2,160

Streaming & Control Units (2 Units)
- Model: Zotac ZBOX MAGNUS EN153060C
- Specs:
  - Intel Core i5-11400H (or i7 optional upgrade)
  - NVIDIA RTX 3060 GPU (12 NVENC sessions)
  - 32 GB RAM
  - 1 TB NVMe SSD
- Roles:
  - Primary: Master OBS encoder for all 12 RTSP feeds
  - Secondary: Slave mirror, hot-standby (configured identically)
- Software:
  - Ubuntu 24.04 LTS
  - OBS Studio (w/ NVENC enabled)
  - OBS WebSocket
  - Watchdog Python script to detect game progression
  - Central configuration web interface
- Cost Estimate: $2,800 × 2 = $5,600 (can omit second unit for now)

Switching Infrastructure (2 Units)
- Model: Ubiquiti Unifi Gen 2 24-Port Gigabit PoE+
- Roles:
  - Live Unit: Serves active cameras & OBS node

  - Redundant Unit: Cold spare ready to switch over
- Cost Estimate: $800 × 2 = $1,600

UPS Backup System
- Capacity: Sufficient to support:
  - 12 PoE Cameras
  - 2 OBS ZBOX Nodes
  - 2 Ubiquiti Switches
- Estimated Runtime: Minimum 15–30 minutes
- Purpose: Graceful fallback and continuity
- Cost Estimate: $1,200

Mounting & Cable Infrastructure
- Magnetic Cable Clips:
  - For attaching Cat 6 to suspended metal ceiling
  - Rapid deployment/removal
  - Qty: Approx. 100-150
- Custom Magnetic Camera Mounts:
  - Designed to attach to ceiling grid system
  - Must support weight/stability of RLC-830A units
  - Designed for non permanent installs
- Cabling:
  - 12 × Cat 6 patch leads (one per camera)
  - Run back to PoE switches
  - Labelled and tagged per lane pair
- Materials Budget Estimate: $800

System Functionality

OBS Streaming Logic (Single Instance)
- 12 RTSP camera streams ingested simultaneously
- Overlays per stream (via web configured URL input)
- Stream output to 12 YouTube private live feeds (1 per pair)

Redundancy Plan
- ZBOX Master does all work during normal operations
- Slave mirrors all configuration via shared config store
- If Master fails, Slave is promoted manually or via watchdog logic

Watchdog Automation
- Monitors HTML scoreboard (Game 1 of 2)
- Detects transitions (Game 1→2, 2→3, etc.)
- Triggers an Ad Scene per lane via OBS-WebSocket
- Returns to Live Scene post-ad

Central Web UI

- Hosted locally on Master ZBOX
- Accessible via browser
- Functions:
  - Stream Start/Stop per lane
  - Overlay URL entry per stream
  - Scene switch control (Live ↔ Ad)
  - Node monitoring + status reporting

Testing & Deployment Plan

1. Bench Test full OBS + Watchdog + 12 simulated RTSP feeds
2. Mount & Wire Cameras with magnetic mounts and clips
3. Run Cabling to main comms room
4. Deploy Switches & ZBOX Units with UPS
5. Configure Web UI, OBS scenes, and watchdog script
6. Failover Test: simulate master failure and switch to slave
7. Client Demo & Sign off

Estimated Total Budget (can omit redundancy objects)

Item	Cost
Cameras (12 × $180)	$2,160
OBS Nodes (2 × $2,800)	$5,600
Ubiquiti PoE Switches (2)	$1,600
UPS System	$1,200
Mounts, Clips, Cables	$800
Estimated Total	$11,360 AUD (excluding freight)

OBS Configuration & Web Admin Portal

OBS Scene Configuration

- 12 OBS scenes, each corresponding to a lane pair (Pair 1&2, Pair 3&4, etc.)
- Each scene includes:
  - RTSP camera feed (from Reolink RLC-830A)
  - 2 HTML Browser Sources for live scoring overlays (one per lane)
  - Configured via OBS-WebSocket
- Scenes switch between 'Live' and 'Ad' automatically based on watchdog triggers

Ad Playback & Trigger Logic

- Each stream has its own independent watchdog script
- Watchdog monitors two HTML overlay sources for each pair
- When both overlays update (e.g., Game 1 → Game 2), an ad is triggered
- Ad Scene displays a full screen video or image

- Ad rotates through a local folder or preset URL list
- After the ad ends, OBS switches back to the Live scene automatically

Web Based Configuration Portal

- Hosted locally on the ZBOX unit
- Accessible from any device on the LAN via browser
- Tabs for each lane pair: Pair 1&2, Pair 3&4, ..., Pair 23&24
- Inside each tab:
  - RTSP URL input
  - Overlay A URL (Lane 1) - Both Versions (DuoHD or Livescore)
  - Overlay B URL (Lane 2) - Both Versions (DuoHD or Livescore)
  - Ad folder or ad URL list input
  - YouTube stream key and title/desc fields
  - Save button to update OBS via WebSocket API

YouTube Streaming Integration

- Uses YouTube Data API v3 with OAuth 2.0 authentication
- Enables full control without logging into YouTube manually
- Features per lane pair:
  - Start/Stop stream
  - Set stream title, description, and visibility
  - Automatically assign or rotate stream keys
- Integrated into the Web UI for centralised management

Streaming Delivery, Embedding & Member Access

Internet Bandwidth Requirements

- Each RTSP stream is encoded and streamed out via OBS to YouTube
- Estimated bitrate per stream: 6 Mbps (1080p30, CBR)
- 12 streams × 6 Mbps = 72 Mbps
- Add ~20% overhead for control traffic and stability ~90 Mbps sustained
- Recommended Upload Speed: At least 100-150 Mbps with failover via multi WAN or 5G backup

YouTube Embedding & Privacy Considerations

- YouTube Live supports 3 visibility modes: Public, Unlisted, Private
- Public: Embeddable but visible/searchable on YouTube (not what we want)
- ***Unlisted: Embeddable, not discoverable (Best for our use case)***
- Private: Requires Google account login, not embeddable (not what we want)
- OBS streams will be set to Unlisted to allow iframe embedding into cornerpins.com.au
- HTML iframe embed codes will be used in lazy loaded tiles on the site

CornerPins Streaming Section with Member Access

- The public facing site (cornerpins.com.au) will include a secure Streaming page
- Displays 12 lane pairs as lazy loaded YouTube tiles, loading only when in view
- Access will be restricted to CornerPins members only
- Admin UI will have a config section for:
  - Event Name ('ANC25')
  - Brief Event Description (Prize fund, Game format, Dates)
  - This metadata will update the stream section on the website automatically
- Integrates with OBS and YouTube API to dynamically set stream titles and visuals

Audio Input & Commentary Integration

- The system will support up to 5 independent audio inputs for:
  - Wireless microphones
  - Roving commentary
  - Ambient audio from the venue
- Audio devices will connect to the OBS Node via USB audio interfaces (USB sound cards or wireless mic receivers)
- Each input can be independently assigned to:
  - A single lane pair stream
  - A shared audio feed across multiple streams
- OBS supports real time mixing and gain control for each input
- Audio levels and source routing can be managed via the Web UI (optional future feature)
- Commentary can be embedded into one or more YouTube streams or toggled as needed