

Wolfpack-Atlas Matrix Routing Integration

Overview

This feature implements synchronized audio-video routing between the Wolfpack video matrix switcher and the Atlas audio processor. It allows users to route video sources through the Wolfpack matrix to provide audio to the Atlas system via 4 dedicated Matrix inputs.

Architecture

System Flow

```
Wolfpack Video Input → Wolfpack Matrix Output (33-36) → Atlas Matrix Input (1-4) → Atlas Zone Output
```

Components

1. Database Schema (Prisma)

- **WolfpackMatrixRouting**: Stores Matrix routing configuration
 - Maps Matrix outputs (1-4) to Wolfpack inputs
 - Tracks current routing state
 - Stores input labels for display
- **WolfpackMatrixState**: Logs routing history
 - Tracks all routing changes
 - Stores channel information
 - Provides audit trail

2. API Endpoints

GET /api/wolfpack/inputs

- Retrieves list of all Wolfpack video inputs
- Returns input labels, channel numbers, and current channel info
- Used to populate the input selector

POST /api/wolfpack/route-to-matrix

- Routes a Wolfpack input to a specific Matrix output (1-4)
- Parameters:
 - `wolfpackInputNumber` : Source input channel
 - `matrixOutputNumber` : Target Matrix output (1-4)
- Updates routing state in database
- Sends routing command to Wolfpack device

GET /api/audio-processor/matrix-routing

- Retrieves current Matrix routing state
- Returns all active routings and recent history

POST /api/audio-processor/matrix-routing

- Updates Matrix routing preferences
- Configures Atlas input labels

3. Services**wolfpackMatrixService.ts**

- `routeWolfpackToMatrix()` : Core routing logic
- Sends TCP/UDP commands to Wolfpack
- Maps Matrix outputs to Wolfpack channels (33-36)
- Handles error cases and timeouts
 - `getMatrixRoutingState()` : Query current routing state
 - `sendWolfpackCommand()` : Low-level command interface

4. UI Components**WolfpackInputSelector.tsx**

- Modal popup for selecting Wolfpack video sources
- Displays all available inputs with labels
- Shows current channel information
- Handles routing on selection
- Provides visual feedback during routing

AudioZoneControl.tsx (Modified)

- Detects Matrix input types
- Shows Wolfpack selector for Matrix inputs
- Maintains direct routing for non-Matrix inputs
- Visual indicators (Radio icon) for Matrix inputs

Usage

User Flow

1. **Select Audio Zone:** User clicks on an audio zone (e.g., "Main Bar")
2. **Choose Input Type:**
 - **Matrix Input** (Matrix 1-4): Opens Wolfpack input selector
 - **Direct Input** (Cable, DTV, Bands, Mics): Direct audio routing
3. **Matrix Input Selection:**
 - Popup shows all Wolfpack video inputs
 - User selects desired input (e.g., "Cable Box 1 - ESPN")
 - System routes video to Matrix output
 - Audio from Matrix input routes to zone
4. **Result:**
 - Video routed but NOT displayed on TVs
 - Audio from selected source plays in zone
 - Routing state saved in database

Matrix Input Configuration

Matrix inputs are identified by:

- `type: 'matrix'` in audio input configuration

- `matrixNumber: 1-4` specifying which Matrix input
- Visual indicator (Radio icon) in UI

Example:

```
{
  id: 'matrix2',
  name: 'Matrix 2',
  isActive: true,
  type: 'matrix',
  matrixNumber: 2
}
```

Technical Details

Wolpack Matrix Outputs

- Matrix outputs on Wolpack are typically channels 33-36
- These correspond to Atlas Matrix inputs 1-4
- Mapping: `wolpackChannel = 32 + matrixNumber`

Routing Commands

Format: `SW I{input} O{output}`

- Example: `SW I5 O33` routes input 5 to Matrix output 1

Database Tables

WolpackMatrixRouting

```
CREATE TABLE "WolpackMatrixRouting" (
  "id" TEXT PRIMARY KEY,
  "matrixOutputNumber" INTEGER UNIQUE NOT NULL,
  "wolpackInputNumber" INTEGER,
  "wolpackInputLabel" TEXT,
  "atlasInputLabel" TEXT,
  "isActive" BOOLEAN DEFAULT true,
  "lastRouted" DATETIME,
  "createdAt" DATETIME DEFAULT CURRENT_TIMESTAMP,
  "updatedAt" DATETIME
);
```

WolpackMatrixState

```
CREATE TABLE "WolpackMatrixState" (
  "id" TEXT PRIMARY KEY,
  "matrixOutputNumber" INTEGER NOT NULL,
  "wolpackInputNumber" INTEGER NOT NULL,
  "wolpackInputLabel" TEXT NOT NULL,
  "channelInfo" TEXT,
  "routedAt" DATETIME DEFAULT CURRENT_TIMESTAMP
);
```

Configuration

Matrix Input Labels

Labels can be customized via the API:

```
POST /api/audio-processor/matrix-routing
{
  "matrixOutputNumber": 1,
  "atlasInputLabel": "Matrix 1 - Sports"
}
```

Wolfpack Connection

Configured in MatrixConfiguration:

- IP Address
- TCP Port (default: 5000)
- UDP Port (default: 4000)
- Protocol (TCP/UDP)

Testing

Manual Testing

1. Open Audio Zone Control page
2. Click on a Matrix input (Matrix 1-4)
3. Verify Wolfpack input selector appears
4. Select a video source
5. Verify routing command sent
6. Check database for routing state

API Testing

```
# Get Wolfpack inputs
curl http://localhost:3000/api/wolfpack/inputs

# Route input to Matrix
curl -X POST http://localhost:3000/api/wolfpack/route-to-matrix \
  -H "Content-Type: application/json" \
  -d '{"wolfpackInputNumber": 5, "matrixOutputNumber": 2}'

# Get routing state
curl http://localhost:3000/api/audio-processor/matrix-routing
```

Future Enhancements

1. **Live Channel Detection:** Query Wolfpack for current channel info
2. **Automatic Label Sync:** Pull Matrix labels from Wolfpack outputs
3. **Routing Presets:** Save common routing configurations
4. **Visual Feedback:** Show active routing in UI
5. **Conflict Detection:** Warn if Matrix output already in use
6. **Batch Routing:** Route multiple Matrix outputs at once

Troubleshooting

Matrix Selector Not Appearing

- Check that input has type: 'matrix' and valid `matrixNumber`
- Verify `WolfpackInputSelector` component is imported

Routing Commands Failing

- Verify Wolfpack IP address and port in `MatrixConfiguration`
- Check network connectivity to Wolfpack device
- Review logs for command errors

Database Errors

- Run `npm run prisma migrate dev` to apply migrations
- Check `DATABASE_URL` in `.env` file
- Verify Prisma Client is generated

Files Modified/Created

Created

- `prisma/migrations/*/add_wolfpack_matrix_routing/migration.sql`
- `src/app/api/wolfpack/inputs/route.ts`
- `src/app/api/wolfpack/route-to-matrix/route.ts`
- `src/app/api/audio-processor/matrix-routing/route.ts`
- `src/services/wolfpackMatrixService.ts`
- `src/components/WolfpackInputSelector.tsx`
- `WOLFPACK_MATRIX_INTEGRATION.md`

Modified

- `prisma/schema.prisma`
- `src/components/AudioZoneControl.tsx`

Support

For issues or questions:

1. Check logs in browser console and server logs
2. Verify database schema is up to date
3. Test API endpoints individually
4. Review Wolfpack device configuration

License

Part of Sports Bar TV Controller system.