

TV Guide Data Implementation

Overview

This implementation adds comprehensive TV guide data pulling from both DirecTV and Fire TV devices, creating a unified program guide system for the Sports Bar AI Assistant.

New API Endpoints

DirecTV Guide Data API

Endpoint: `/api/directv-devices/guide-data`

- **Method:** POST - Fetch guide data from DirecTV receiver
- **Method:** GET - API information

Features:

- Channel lineup retrieval from DirecTV receivers
- Program guide polling for multiple channels
- Current program information extraction
- HD/recording capability detection
- Fallback sample data when device unavailable

Data Retrieved:

- Channel numbers and callsigns
- Program titles and descriptions
- Start/end times and duration
- Categories and ratings
- HD status and recording capabilities
- Episode/season information

Fire TV Guide Data API

Endpoint: `/api/firetv-devices/guide-data`

- **Method:** POST - Fetch guide data from Fire TV device
- **Method:** GET - API information

Features:

- Installed streaming app detection
- App-specific schedule extraction
- Live TV guide (where available)
- Content recommendation parsing
- ADB connection management

Supported Apps:

- Prime Video (schedules and originals)
- YouTube TV (live channel guide)
- Hulu (live TV listings)
- Netflix (trending content)
- Paramount+ (scheduled content)
- Apple TV+ (original programming)

Unified Guide API

Endpoint: `/api/unified-guide`

- **Method:** POST - Aggregate guide data from multiple devices
- **Method:** GET - Cached data and API information

Features:

- Multi-device guide aggregation
- Real-time program status calculation
- Smart priority scoring
- Category and source analytics
- Cached data management
- Live program filtering

New Components

UnifiedGuideViewer Component

Location: `/src/components/UnifiedGuideViewer.tsx`

Features:

- Grid and list view modes
- Real-time search and filtering
- Category and device filtering
- Live-only program toggle
- Auto-refresh capability
- Priority-based highlighting
- Device status indicators

Display Elements:

- Program titles and descriptions
- Start/end times with duration
- Channel/app information
- Live status indicators
- Priority scoring badges
- Device association
- Matrix input mapping

TV Guide Dashboard Page

Location: `/src/app/tv-guide/page.tsx`

Features:

- Device overview and status
- Auto-refresh toggle
- Direct device configuration access
- Real-time device counting
- Unified guide display integration

Data Flow

DirecTV Guide Polling

1. **Connection:** HTTP API to DirecTV receiver (port 8080)

2. **Channel Lineup:** GET `/tv/getChannels`
3. **Program Data:** GET `/tv/getPrograms?major={channel}&startTime={start}&endTime={end}`
4. **Current Program:** GET `/tv/getTuned` (fallback)
5. **Data Enrichment:** Priority scoring, live status, recording capabilities

Fire TV Guide Polling

1. **ADB Connection:** Connect via ADB (port 5555)
2. **App Detection:** Query installed streaming applications
3. **Schedule Extraction:** Per-app guide data retrieval
4. **Live TV Check:** Fire TV Recast or similar integration
5. **Content Parsing:** Recommendations and trending content

Unified Processing

1. **Multi-Device Fetch:** Parallel guide data collection
2. **Data Normalization:** Standardized program format
3. **Priority Calculation:** Sports/live content prioritization
4. **Time Analysis:** Current/upcoming program status
5. **Caching:** Local storage for offline access
6. **Analytics:** Device success rates and content categorization

Installation Instructions

1. Add to Existing Project

All files are designed to integrate with the existing Sports Bar TV Controller project structure.

2. Update Navigation

Add TV Guide link to main navigation:

```
// Add to your navigation component
<Link href="/tv-guide" className="nav-link">
  <Calendar className="w-4 h-4" />
  TV Guide
</Link>
```

3. Device Configuration

Ensure devices are properly configured in `/device-config` with:

- Correct IP addresses
- Appropriate ports (DirecTV: 8080, Fire TV: 5555)
- Matrix input channel assignments
- Network connectivity

4. Enable APIs

The system automatically creates the required API routes. Ensure:

- Data directory permissions for caching
- Network access to device IPs
- Firewall rules allowing HTTP/ADB connections

Usage Examples

Fetch All Guide Data

```
const response = await fetch('/api/unified-guide', {
  method: 'POST',
  headers: { 'Content-Type': 'application/json' },
  body: JSON.stringify({
    deviceList: [
      { id: 'directv1', type: 'directv', ipAddress: '192.168.1.150', port: 8080 },
      { id: 'firetv1', type: 'firetv', ipAddress: '192.168.1.151', port: 5555 }
    ],
    timeRange: {
      start: new Date().toISOString(),
      end: new Date(Date.now() + 24 * 60 * 60 * 1000).toISOString()
    }
  })
})
```

Get Live Programs Only

```
const livePrograms = await fetch('/api/unified-guide?action=live-programs')
```

Cache Management

```
const cachedGuide = await fetch('/api/unified-guide?action=cache')
const guideSummary = await fetch('/api/unified-guide?action=cache&format=summary')
```

Integration Points

Existing Systems

- **Device Management:** Uses existing DirecTV/Fire TV device configurations
- **Matrix Integration:** Maps programs to matrix input channels
- **Subscription System:** Can be enhanced with guide data correlation
- **AI Features:** Guide data feeds into smart recommendation systems

Bartender Remote Enhancement

Guide data can enhance the bartender remote by:

- Showing current/upcoming programs when switching inputs
- Providing context-aware channel recommendations
- Displaying sports-specific programming alerts
- Offering smart recording suggestions

Sports Guide Integration

The unified guide complements the existing sports guide by:

- Adding device-specific sports content
- Providing real broadcast channel mapping
- Enabling cross-device sports discovery
- Supporting multi-source sports scheduling

Technical Benefits

Performance

- **Parallel Processing:** Simultaneous device polling
- **Intelligent Caching:** Reduced API calls and faster loading
- **Selective Updates:** Refresh only changed data
- **Priority Queue:** Focus on high-value content first

Reliability

- **Fallback Data:** Sample data when devices offline
- **Error Handling:** Graceful degradation per device
- **Connection Retry:** Automatic reconnection attempts
- **Data Validation:** Ensure program data integrity

Scalability

- **Multi-Device Support:** Unlimited device connections
- **Modular Architecture:** Easy addition of new device types
- **API Extensibility:** Simple integration of new guide sources
- **Data Export:** Standardized format for external systems

Future Enhancements

Advanced Features

- **DVR Integration:** Recording scheduling from guide
- **Conflict Detection:** Multi-device recording conflicts
- **Recommendation Engine:** AI-powered content suggestions
- **Social Features:** Patron program requests and voting
- **Analytics Dashboard:** Viewing pattern analysis

Additional Device Support

- **Cable Boxes:** Generic cable box guide integration
- **Roku Devices:** Roku channel guide extraction
- **Apple TV:** Apple TV app schedule data
- **Gaming Consoles:** Xbox/PlayStation streaming guides

Smart Automation

- **Auto-Switching:** Automatic input changes for preferred content
- **Schedule Alerts:** Notifications for upcoming shows
- **Batch Recording:** Smart recording scheduling
- **Content Discovery:** Cross-platform content matching

This implementation provides a comprehensive foundation for unified TV guide data management, enabling enhanced customer experiences and operational efficiency in the sports bar environment.