Fix Summary - October 16, 2025

Critical Issues Resolved

This document summarizes the fixes applied to resolve two critical errors reported in PM2 logs.

Issue #1: Prisma Singleton Pattern - "Cannot read properties of undefined"

Error Message

```
[Preset Fetch] Error fetching presets by device: TypeError: Cannot read properties of
undefined (reading 'findMany')
at p (/home/ubuntu/Sports-Bar-TV-Controller/.next/server/app/api/channel-presets/by-de
vice/route.js:1:941)
```

Root Cause

Multiple files throughout the codebase were creating their own `PrismaClient` instances using `new PrismaClient()`. In Next.js applications, this leads to:
- **Database connection pool exhaustion** - Each instance creates its own connection pool
- **Ghost database connections** - Connections that aren't properly cleaned up
- **Undefined prisma client references** - Race conditions during initialization
- **Memory leaks** - Multiple clients consuming resources

Solution

Implemented the Prisma singleton pattern across **15 files** to ensure only one PrismaClient instance exists throughout the application lifecycle.

Files Fixed

1. `src/services/presetReorderService.ts`
2. `src/lib/services/qa-uploader.ts`
3. `src/lib/services/cec-discovery-service.ts`
4. `src/lib/services/qa-generator.ts`
5. `src/lib/atlas-meter-service.ts`
6. `src/lib/scheduler-service.ts`
7. `src/lib/firecube/sideload-service.ts`
8. `src/lib/firecube/keep-awake-scheduler.ts`
9. `src/lib/firecube/subscription-detector.ts`
10. `src/lib/firecube/app-discovery.ts`
11. `src/lib/firecube/sports-content-detector.ts`
12. `src/lib/tvDocs/generateQA.ts`
13. `src/lib/tvDocs/index.ts`
14. `src/lib/ai-knowledge-qa.ts`

15. `src/lib/ai-knowledge-enhanced.ts`

Code Changes

Before (Incorrect):

```
import { PrismaClient } from '@prisma/client'
const prisma = new PrismaClient()
```

After (Correct):

```
import prisma from "@/lib/prisma"
// Using singleton prisma from @/lib/prisma
```

Singleton Implementation

The singleton pattern is implemented in `src/lib/prisma.ts`:

```
import { PrismaClient } from '@prisma/client'

const globalForPrisma = globalThis as unknown as {
  prisma: PrismaClient | undefined
}

export const prisma = globalForPrisma.prisma ?? new PrismaClient({
  log: process.env.NODE_ENV === 'development' ? ['query', 'error', 'warn'] : ['error']
,
})

if (process.env.NODE_ENV !== 'production') globalForPrisma.prisma = prisma

export default prisma
```

Impact

✅ **Eliminates** "Cannot read properties of undefined" errors
✅ **Prevents** database connection pool exhaustion
✅ **Improves** application stability and performance
✅ **Reduces** memory usage
✅ **Ensures** consistent database access across the application

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Issue #2: DirecTV 403 Forbidden Error

Error Message

```
DirecTV command error: Error: HTTP 403: Forbidden.
Sending DirecTV command to: http://192.168.5.121:8080/remote/processKey?
key=KEY_8&hold=keyPress
```

Root Cause

DirecTV receivers have a security feature called "External Device Access" that must be manually enabled for the SHEF (Set-top Box HTTP Exported Functionality) API to work. When this setting is disabled (the default), all API requests return HTTP 403 Forbidden.

Solution

Enhanced error handling to provide clear, actionable instructions when 403 errors occur, guiding users to enable the required setting.

Files Modified

1. `src/app/api/directv-devices/send-command/route.ts`
   - Added specific 403 error detection and handling
   - Provides step-by-step instructions to enable External Device Access
   - Added 404 error handling for unsupported receivers

2. `src/lib/directv/shef-client.ts`
   - Enhanced `isShefEnabled()` method with better error logging
   - Provides console error messages with troubleshooting steps

Enhanced Error Messages

403 Forbidden Error:

```
HTTP 403: External Device Access is disabled on the DirecTV receiver.
To enable: Press MENU on DirecTV remote → Settings & Help → Settings →
Whole-Home → External Device → Enable "External Access".
Then restart the receiver.
```

404 Not Found Error:

```
HTTP 404: SHEF API endpoint not found. Verify the receiver supports
network control and is using the correct firmware version.
```

How to Enable External Device Access

Follow these steps on the DirecTV receiver:

1. Press **MENU** on the DirecTV remote control
2. Navigate to **Settings & Help**
3. Select **Settings**
4. Go to **Whole-Home**
5. Select **External Device**
6. Enable **"External Access"**
7. **Restart the DirecTV receiver** (power cycle recommended)
8. Test connection from Sports Bar TV Controller

Verification

After enabling External Device Access, verify the connection works:

```
# From the server
curl http://192.168.5.121:8080/info/getVersion
```

Expected Response: JSON with receiver information (receiverId, accessCardId, version, etc.)
Error Response: HTTP 403 if External Access is still disabled

Supported DirecTV Receivers

- Genie HD DVR (HR44, HR54)

- HR24 HD DVR

- H24 HD Receiver

- Other SHEF-compatible receivers with firmware supporting the SHEF API

Impact

✅ **Provides** clear, actionable error messages
✅ **Reduces** troubleshooting time significantly
✅ **Documents** the solution for future reference
✅ **Prevents** confusion between network issues and security settings
✅ **Improves** user experience with helpful guidance

Documentation Updates

SYSTEM_DOCUMENTATION.md Changes

- **Added** "Recent Fixes and Changes" section

- **Documented** Prisma singleton pattern implementation

- **Included** step-by-step DirecTV troubleshooting guide

- **Provided** code examples showing before/after changes

- **Updated** version to 2.3

- **Updated** last modified date to October 16, 2025

Testing & Verification

Prisma Fix Testing

1. **Restart the application:**
   ```bash
   pm2 restart sports-bar-tv
   ```

2. **Test channel preset functionality:**
   - Navigate to http://24.123.87.42:3000/remote
   - Try changing channels using presets
   - Verify no errors occur

3. **Monitor logs:**
   ```bash
   pm2 logs sports-bar-tv --lines 50
   ```

4. **Verify success:**
   - No more "Cannot read properties of undefined" errors
   - Channel presets load correctly
   - Database queries execute successfully

DirecTV Fix Testing

1. **Test without External Access enabled:**
   - Try sending a DirecTV command from the remote control
   - Verify the new error message appears with instructions

2. **Enable External Access:**
   - Follow the steps in the error message
   - Enable "External Access" on the DirecTV receiver
   - Restart the receiver

3. **Test with External Access enabled:**
   - Try sending commands again
   - Verify commands execute successfully
   - Check PM2 logs for successful command execution

4. **Verify error handling:**
   - Error messages are clear and actionable
   - Instructions are accurate and easy to follow

GitHub Pull Request

PR #197: Fix: Critical Prisma Singleton and DirecTV 403 Error Handling
URL: https://github.com/dfultonthebar/Sports-Bar-TV-Controller/pull/197
Branch: `fix/prisma-directv-errors`
Status: Open (awaiting user verification)

Commits

1. **6218614** - Fix: Prisma singleton pattern and DirecTV 403 error handling
2. **a60bf52** - docs: Update system documentation with Prisma and DirecTV fixes

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Deployment Instructions

After the PR is merged and you're ready to deploy:

1. **SSH into production server:**
   ```bash
   ssh -p 224 ubuntu@24.123.87.42
   ```

2. **Navigate to project directory:**
   ```bash
   cd /home/ubuntu/Sports-Bar-TV-Controller
   ```

3. **Pull latest changes:**

   bash
   ```
   git pull origin main
   ```

4. **Install dependencies (if needed):**

   bash
   ```
   npm install
   ```

5. **Generate Prisma Client:**

   bash
   ```
   npx prisma generate
   ```

6. **Build the application:**

   bash
   ```
   npm run build
   ```

7. **Restart PM2:**

   bash
   ```
   pm2 restart sports-bar-tv
   ```

8. **Monitor logs:**

   bash
   ```
   pm2 logs sports-bar-tv
   ```

9. **Verify functionality:**

   - Test channel presets at http://24.123.87.42:3000/remote
   - Test DirecTV commands
   - Check for any errors in logs

Additional Notes

Prisma Best Practices

- **Always** use the singleton pattern for PrismaClient in Next.js
- **Never** create new PrismaClient instances in API routes or components
- **Import** from `@/lib/prisma` for all database operations
- **Monitor** connection pool usage in production

DirecTV Integration Notes

- External Device Access must be enabled on **each** DirecTV receiver
- The setting may reset after firmware updates
- Some older receivers may not support the SHEF API
- Network connectivity and firewall rules must allow port 8080

Future Improvements

- Consider adding automatic SHEF API capability detection
- Implement periodic health checks for DirecTV receivers
- Add UI indicator for External Device Access status
- Create automated tests for Prisma singleton pattern

Support & Troubleshooting

If Prisma Errors Persist

1. Check PM2 logs for specific error messages
2. Verify Prisma Client is generated: `npx prisma generate`
3. Check database connectivity: `npx prisma db pull`
4. Restart the application: `pm2 restart sports-bar-tv`

If DirecTV Commands Still Fail

1. Verify External Device Access is enabled
2. Restart the DirecTV receiver (power cycle)
3. Test direct API access: `curl http://[receiver-ip]:8080/info/getVersion`
4. Check network connectivity and firewall rules
5. Verify receiver supports SHEF API (check model compatibility)

Getting Help

- **PM2 Logs:** `pm2 logs sports-bar-tv`
- **GitHub Issues:** https://github.com/dfultonthebar/Sports-Bar-TV-Controller/issues
- **Documentation:** `/home/ubuntu/Sports-Bar-TV-Controller/SYSTEM_DOCUMENTATION.md`

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