

Connectivity Solution - Implementation Guide

Problem Summary

90% of project time spent on connectivity issues:

- Cloud-init blocking boot
- Network not configuring
- SSH not accessible
- Multiple conflicting services

Root Causes Identified

1. **Cloud-init is too persistent** - Starts before our services, deeply integrated
2. **Too many network services** - Conflicting with each other
3. **Circular dependencies** - Services waiting for each other
4. **Timing issues** - Services starting in wrong order

Complete Solution

1. Remove Cloud-init Package Entirely

Why: Disabling isn't enough - need to remove it completely

How:

```
apt-get remove --purge cloud-init cloud-initramfs-growroot cloud-initramfs-rescuepop -y  
rm -rf /etc/cloud /var/lib/cloud /usr/lib/cloud-init
```

Applied in: Build script AND runtime fix script

2. Kernel Parameters

Why: Disable cloud-init at kernel level (earliest possible)

How:

Add to `cmdline.txt`:

```
cloud-init=disabled cloud-init=none
```

Applied in: Build script AND runtime fix script

3. Unified Boot Service

Why: One service that does everything, no dependencies

Service: `00-unified-boot.service`

- Runs immediately after `local-fs.target`
- Kills cloud-init first
- Configures network directly
- Enables SSH immediately
- No dependencies on `network-online.target`
- No dependencies on cloud-init

Applied in: New service file

4. Systemd Overrides

Why: Prevent cloud-init from starting even if package exists

How:

- Override file: `/etc/systemd/system/cloud-init.target.d/override.conf`
- Mask target: `cloud-init.target` → `/dev/null`
- Mask services: All cloud-init services → `/dev/null`

Applied in: Build script AND runtime fix script

5. Remove Conflicting Services

Why: Too many services trying to configure network

How:

- Use only `00-unified-boot.service`
- Disable NetworkManager (or configure properly)
- Disable dhcpcd (or configure properly)
- Disable systemd-networkd (or configure properly)

Applied in: Build script

Implementation

Option 1: Apply to SD Card (Quick Fix)

```
cd ~/moodeaudio-cursor  
./COMPREHENSIVE_CONNECTIVITY_FIX.sh
```

This script:

1. Removes cloud-init package
2. Removes cloud-init files
3. Updates cmdline.txt
4. Installs unified boot service
5. Applies all systemd overrides

Option 2: Rebuild Image (Permanent Fix)

```
cd ~/moodeaudio-cursor  
sudo ./tools/build.sh
```

The build script now includes:

1. Cloud-init package removal
2. Kernel parameters
3. Unified boot service
4. All systemd overrides

Expected Results

After applying fixes:

- Boot completes in < 2 minutes

- Network configured within 30 seconds
- SSH accessible within 60 seconds
- No cloud-init blocking
- Reliable connectivity every boot

Verification

After booting, verify:

```
# Check cloud-init is gone
systemctl status cloud-init.target # Should show "masked"
ps aux | grep cloud-init # Should show nothing

# Check network
ip addr show eth0 # Should show 192.168.10.2

# Check SSH
systemctl status ssh # Should be active
ssh andre@192.168.10.2 # Should connect
```

Files Modified

1. `moode-source/lib/systemd/system/00-unified-boot.service` - New unified service
2. `imgbuild/moode-cfg/stage3_03-ghettoblaster-custom_00-run-chroot.sh` - Build script updated
3. `COMPREHENSIVE_CONNECTIVITY_FIX.sh` - Runtime fix script
4. `docs/CONNECTIVITY_PROBLEMS_DEEP_ANALYSIS.md` - Analysis document
5. `docs/CONNECTIVITY_SOLUTION_IMPLEMENTATION.md` - This document

Status

- Solution designed
- Unified service created
- Build script updated
- Runtime fix script created
- Ready for testing