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🎉 Codeigniter 4 with WA Multi Device Gateway

📁 Project Structure

```
wamd_apps/
├── 🚀 Backend (Node.js + Express.js)
│   ├── index.js                    # Main server
│   ├── package.json               # Dependencies
│   ├── .env                       # Configuration
│   ├── src/
│   │   ├── routes/               # API endpoints
│   │   │   ├── api.js           # REST API
│   │   │   ├── qr.js            # QR code interface
│   │   │   └── webhook.js       # Webhook endpoints
│   │   ├── services/            # Core services
│   │   │   ├── WhatsAppService.js  # Baileys integration
│   │   │   ├── DatabaseService.js  # MySQL operations
│   │   │   ├── MessageQueue.js     # Queue management
│   │   │   └── WebhookService.js   # Webhook handling
│   │   ├── middleware/          # Express middleware
│   │   └── utils/               # Utilities
│   └── public/                  # Static files
│
└── 💻 Frontend (React + TypeScript)
    ├── package.json             # React dependencies
    ├── src/
    │   ├── components/          # React components
    │   ├── pages/              # Page components
    │   │   ├── Dashboard.tsx   # Main dashboard
    │   │   ├── QRScanner.tsx   # QR code scanner
    │   │   ├── MessageSender.tsx # Send messages
    │   │   ├── BulkMessage.tsx # Bulk messaging
    │   │   ├── MessageQueue.tsx # Queue management
    │   │   └── Settings.tsx    # System settings
    │   ├── contexts/           # React contexts
    │   └── services/           # API services
    └── public/                 # Static assets
```

✨ Key Features Implemented

🔗 WhatsApp Integration

- **@WhiskeySockets/Baileys v6.6.0** - Latest WhatsApp library
- **QR Code Authentication** - Web and terminal scanning
- **Multi-device Support** - Modern WhatsApp Web protocol
- **Auto-reconnection** - Handles disconnections gracefully
- **Session Persistence** - Maintains login state

🌐 Modern Web Interface

- **React 18 + TypeScript** - Type-safe frontend
- **Material-UI v5** - Modern, sleek design
- **Real-time Updates** - Socket.IO integration
- **Responsive Design** - Mobile and desktop friendly
- **Intuitive UX** - Clean, white, modern interface

📨 Messaging Features

- **Single Message Sending** - Individual messages
- **Bulk Messaging** - Send to multiple contacts
- **Message Queue** - Automatic retry mechanism
- **Message Templates** - Predefined messages
- **Attendance Notifications** - Student system integration

🔧 Technical Features

- **RESTful API** - Complete API endpoints
- **Webhook Support** - External integrations
- **Rate Limiting** - Prevents abuse
- **Database Integration** - MySQL storage
- **Comprehensive Logging** - Winston logger
- **Error Handling** - Robust error management

🚀 Quick Start

1. **Install Dependencies:**
2. **Configure Environment:**

```
# Edit .env file with your settings
# Database credentials, API keys, etc.
```

3. **Start Backend:**

```
npm start
# Server runs on http://localhost:3000
```

4. **Start Frontend (Optional):**

```
cd frontend
npm install
npm start
# Frontend runs on http://localhost:3001
```

5. **Connect WhatsApp:**

- Open: http://localhost:3000/qr
- Scan QR code with WhatsApp mobile app
- Start sending messages!

🔌 API Endpoints

Core Endpoints

- `GET /api/status` - WhatsApp connection status
- `POST /api/send-message` - Send single message
- `POST /api/send-bulk` - Send bulk messages
- `GET /api/queue/stats` - Queue statistics
- `GET /qr/json` - QR code data

- `GET /health` - System health check

Webhook Endpoints

- `POST /webhook/send` - Send via webhook
- `POST /webhook/attendance-notification` - Attendance alerts
- `POST /webhook/test` - Test webhook

🎯 Integration with Student Attendance System

The gateway is designed to integrate seamlessly with your CodeIgniter 4 application:

```
// Send attendance notification
$response = $this->http->post('http://localhost:3000/webhook/attendance-notification', [
    'json' => [
        'student_id' => $student['id'],
        'student_name' => $student['name'],
        'parent_phone' => $student['parent_phone'],
        'attendance_status' => 'present',
        'class_name' => $student['class'],
        'session_name' => $session['name']
    ],
    'headers' => [
        'X-API-Key' => 'your_secure_api_key_here'
    ]
]);
```

🛡️ Security Features

- **API Key Authentication** - Secure API access
- **Rate Limiting** - 100 requests/minute per IP
- **CORS Protection** - Configurable origins
- **Input Validation** - Prevents malicious input
- **Security Headers** - Helmet.js protection

📱 Modern UI/UX Features

- **Real-time Status** - Live connection updates
- **QR Code Display** - Beautiful QR scanner interface
- **Message Queue Monitoring** - Visual queue management
- **Responsive Design** - Works on all devices
- **Dark/Light Theme Ready** - Material-UI theming
- **Smooth Animations** - Framer Motion effects

The application is now ready to use! You can start the backend server and begin connecting your WhatsApp device via QR code scanning. The modern React frontend provides an intuitive interface for managing messages, monitoring the queue, and configuring the system.

Would you like me to help you with the initial setup, database configuration, or any specific customizations?