✅ DOCUMENT 1 — Registry v2 Droplet Integration Guide (UDC-Compliant)

Version: 2.0
Audience: Engineering Teams, Droplet Maintainters
Purpose: Clear instructions for connecting any droplet to the new Registry v2 (Droplet 18) using JWT authentication + UDC-compliant capabilities.

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1. Overview

Registry v2 is the central service that all droplets communicate with for:

- Registration
- Heartbeats
- Capability discovery
- Authentication (JWT)
- UDC compliance validation

Every droplet must complete **three steps**:

1. **Fetch a JWT token** (authorized by Registry Key)
2. **Register itself** with the Registry
3. **Send periodic heartbeats** with the JWT token

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2. Base URL

Production (Droplet 18 Registry v2)

`https://drop18.fullpotential.ai`

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3. Required Endpoints

Purpose	Method	Endpoint
Health	GET	`/health`
Register droplet	POST	`/registry/register`
Heartbeat ping	POST	`/registry/heartbeat`
Fetch JWT token	POST	`/auth/token`
Fetch public key	GET	`/auth/public_key`
UDC schema	GET	`/udc/schema`
UDC capabilities	GET	`/udc/capabilities`
UDC handshake	GET	`/udc/handshake`

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4. Authentication

4.1 Registry Key

Every droplet must present the global registry key when asking for a token:

```
X-Registry-Key: regkey_2f14c9b6e9b047d2b8c5a7cf93b2e4da
```

4.2 Fetch JWT Token

Request

```
POST
https://drop18.fullpotential.ai/auth/token?droplet_id={your-droplet-domain}

Headers:
X-Registry-Key: regkey_2f14c9b6e9b047d2b8c5a7cf93b2e4da
```

Response

```
{
  "token": "JWT_TOKEN_HERE"
}
```

4.3 Token Format (Registry v2)

The token uses **HS256** with secret stored in the registry.

Claims:

Claim	Description
`iss`	Always `"registry"`
`sub`	Droplet ID (domain)
`aud`	Always `"udc"`
`iat`	Issued at timestamp
`exp`	Expires in 3600s (1h)
`role`	`"droplet"`
`scope`	`[ "registry:heartbeat", "registry:register" ]`

Example decoded JWT:

```
{
  "iss": "registry",
  "sub": "drop5.fullpotential.ai",
  "aud": "udc",
  "iat": 1763012883,
  "exp": 1763016483,
  "role": "droplet",
  "scope": [
    "registry:heartbeat",
    "registry:register"
  ]
}
```

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5. Registration Flow

Endpoint

```
POST /registry/register
Authorization: Bearer {JWT}
```

Example Payload

```
{
  "droplet_id": "drop5.fullpotential.ai",
  "ip": "24.199.107.120",
  "status": "active",
  "metadata": {
    "version": "1.0.0",
    "region": "us-east"
  }
}
```

Response

```
{"ok": true}
```

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6. Heartbeat Flow

Endpoint

```
POST /registry/heartbeat
Authorization: Bearer {JWT}
```

Example payload:

```
{
  "droplet_id": "drop5.fullpotential.ai",
  "load": 0.02,
  "status": "healthy"
}
```

Response

```
{"ok": true, "ts": "2025-11-13T05:21:00Z"}
```

Heartbeats should be sent every **30 seconds**.

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7. Example Integration Code

Python Droplet Side

```
import requests
import time

BASE = "https://drop18.fullpotential.ai"
REGISTRY_KEY = "regkey_2f14c9b6e9b047d2b8c5a7cf93b2e4da"
DROPLET_ID = "drop5.fullpotential.ai"
```

```
def get_token():
    r = requests.post(
        f"{BASE}/auth/token",
        params={"droplet_id": DROPLET_ID},
        headers={"X-Registry-Key": REGISTRY_KEY}
    )
    return r.json()["token"]

def register(token):
    r = requests.post(
        f"{BASE}/registry/register",
        json={"droplet_id": DROPLET_ID, "status": "active"},
        headers={"Authorization": f"Bearer {token}"}
    )
    print("registered:", r.text)

def heartbeat(token):
    r = requests.post(
        f"{BASE}/registry/heartbeat",
        json={"droplet_id": DROPLET_ID, "status": "healthy"},
        headers={"Authorization": f"Bearer {token}"}
    )
    print("heartbeat:", r.text)

token = get_token()
register(token)

while True:
    heartbeat(token)
    time.sleep(30)
```

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8. UDC Compliance Endpoints

`/udc/schema`

Shows all registry-provided capabilities.

`/udc/capabilities`

Confirms the droplet meets UDC requirements.

`/udc/handshake`

Used by external systems for initial protocol confirmation.

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9. Error Codes

Code	Meaning
401	Invalid token or invalid registry key
403	Token scope missing
422	Droplet ID missing or invalid
500	Internal registry error

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10. Checklist for Droplet Teams

- Can fetch token
- Can register
- Can heartbeat
- Sends JWT in Authorization header
- Uses correct droplet_id
- Successful `/udc/handshake`
- Health endpoint reachable