

ENTROPICA FORENSIC MODEL — APPENDIX I

Deployment Profiles

Layer Activation and Spawn Governance

Version 1.7

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Abstract

Appendix I defines deployment profiles configuring EFM layer activation and spawn governance parameters. Version 1.6 adds comprehensive Spawn Parameters for each profile.

Contents

1 Profile Summary

Parameter	Minimal	Standard	Swarm	Research	Constitutional
Layers	0–1	0–2	0–5	0–2,M	0–6
Autonomy	2	4	5	5	6
τ_{spawn}	0.9	0.7	0.6	0.65	0.7
D_{max}	3	10	15	8	10
R_{max}	10	100	500	200	100
R_{local}	2	10	50	30	10
V_{max}	50	1000	5000	2000	1000

Table 1: Spawn parameters by deployment profile.

2 Profile Details

2.1 Minimal (Research/Sandbox)

- Active Layers: 0, 0.5, 1
- Autonomy Level: 2 (Low)
- Gardener: Always required
- Spawn: Explicit authorization only, very restricted

2.2 Standard (Production)

- Active Layers: 0, 0.5, 1, 2
- Autonomy Level: 4 (Moderate)
- Gardener: CRITICAL events only
- Spawn: Task-based, Arbiter validates

2.3 Swarm (Distributed)

- Active Layers: 0–5 (Full Forest)
- Autonomy Level: 5 (High)
- Gardener: Constitutional changes only
- Spawn: Swarm consensus, high throughput

2.4 Research (Probe/Exploration)

- Active Layers: 0–2, Discovery Stack (M)
- Autonomy Level: 5 (High)
- Gardener: Constitutional changes only
- Spawn: Discovery-driven, ephemeral probes

2.5 Constitutional (Full Governance)

- Active Layers: 0–6 (All)
- Autonomy Level: 6 (Bounded)
- Gardener: Layer 0/6 changes only
- Spawn: Constitutional validation

3 Spawn Condition Customization

Condition	Standard	Swarm	Research
S_1 (Task)	Explicit task	Swarm consensus	Discovery novelty
S_2 (Resources)	Parent alloc	Pooled Vault	Exploration budget
S_3 (Health)	$H \geq 0.7$	$H \geq 0.6$	$H \geq 0.65$
S_4 (Depth)	$d < 10$	$d < 15$	$d < 8$
S_5 (Rate)	Per-parent	Coordinator elevated	Burst allowed
S_6 (Integrity)	No ANOMALY	Swarm health	Probe isolation

4 Testing and Validation

4.1 Profile Validation Tests

Each deployment profile must pass validation before use:

#	Test	Validates
I-1	Parameter bounds	All spawn parameters within valid ranges
I-2	Layer consistency	Active layers match profile spec
I-3	Autonomy enforcement	Autonomy level correctly restricts operations
I-4	Gardener triggers	Correct events trigger Gardener notification
I-5	Cross-profile isolation	Profile change requires restart
I-6	Default selection	System selects appropriate default profile

Table 2: Profile validation test suite.

4.2 Spawn Parameter Invariants

1. **Bound Invariant:** \forall profile P : $\tau_{spawn}^{min} \leq \tau_{spawn} \leq \tau_{spawn}^{max}$
2. **Depth Invariant:** \forall capsule C : $depth(C) \leq D_{max}(profile)$
3. **Rate Invariant:** $\forall t$: $R(t) \leq R_{max}(profile)$
4. **Vault Invariant:** $\forall t$: $V_{used}(t) \leq V_{max}(profile)$

4.3 Profile Transition Testing

When transitioning between profiles (e.g., SANDBOX \rightarrow PRODUCTION):

1. Verify all capsules respect new bounds
2. Verify ASG parameters within new profile limits
3. Verify Gardener notification triggers updated
4. Verify active layers match new profile

Changelog

v1.7 — Added Testing and Validation section, profile invariants

v1.6 — Added Spawn Governance Parameters, Research profile

v1.5 — Layer activation matrix, autonomy levels