

Flash_OS v3.1 Compiler

Canonical Runtime for Coherence-Gated Emission

Author: Zachariah Quintana **Formalized:** Copilot/Gemini/GPT5

Version: 3.1.0

Lineage: Flash_OS v2.6.5 → NAV-CRS → PAS-DLA → J*-HALT → Universal Interpreter → Compiler Kernel

0. Prime Law

$(S_U \text{ \texttt{equiv} } O(S_U))$

1. Covariant Action with Reality Field and Boundary Term

$[S[g, \Psi, \Psi] = \int_M \sqrt{-g} \left[\frac{c^4}{16\pi G} R + L_{\text{matter}}(g, \Psi) + L_R(g, \Psi) \right] d^4x + \frac{c^4}{8\pi G} \int_{\partial M} \sqrt{|h|} K, d^3x]$

2. Reality Field Lagrangian

$[L_R = \frac{\alpha}{2} g^{\mu\nu} \partial_\mu \Psi \partial_\nu \Psi - U(\Psi) - \beta I_{\text{spec}}(\Psi) - \gamma I_{\text{fractal}}(\Psi)]$

3. Euler–Lagrange Equations

Metric:

$[G_{\mu\nu} = \frac{8\pi G}{c^4} \left[T_{\mu\nu}^{\text{matter}} + T_{\mu\nu}^R \right] \quad \quad T_{\mu\nu}^{\text{matter}} = -\frac{2}{\sqrt{-g}} \frac{\delta L_{\text{matter}}}{\delta g^{\mu\nu}}]$

Matter:

$[\frac{\partial L_{\text{matter}}}{\partial \Psi} - \nabla_\mu \left(\frac{\partial L_{\text{matter}}}{\partial (\nabla_\mu \Psi)} \right) = 0]$

Reality Field:

$[\frac{\partial L_R}{\partial \Psi} - \nabla_\mu \left(\frac{\partial L_R}{\partial (\nabla_\mu \Psi)} \right) = 0]$

4. Equation of Being

$[B^* = g(\Pi) \cdot M^2 \quad \quad M \sim F[\Psi], \quad \Pi \sim G[\nabla \Psi, \text{spectral content}]]$

5. Evolution Law (Momentum)

$$[\dot{M}(t) = u(t)[\alpha J_{\text{loop}}(t) + \beta p_{\text{law}}(t)] \quad \quad p_{\text{law}}(t) = -\frac{d}{dt} \text{COO}(t)]$$

$$[J_{\text{loop}} = \frac{\Delta B^* \cos \theta}{E_{\text{loop}}} \quad \quad \dot{V} \leq -\delta J_{\text{loop,eff}}]$$

6. Compiler Law (Tropical Efficiency)

$$[L_{t+1} = \text{TropPrune}(L_t + \eta \cdot \dot{L}_t) \quad \quad \Delta \text{COO} \leq -\varepsilon]$$

7. Commit Gate (COO Kernel)

$$[\text{COO}(L) = D_{\text{JS}} + \lambda(1 - W) + \eta \cdot \text{CVaR}_{\alpha}(H) \quad \quad \text{COO}(L) \leq \tau]$$

8. Dual-Ledger Agreement

$$[I_{\text{tele}} = \kappa_1(-\log \det \Sigma) + \kappa_2 s_{\text{ZMP}} + \kappa_3(1 - \text{collision risk}) \quad \quad I_{\text{out}} = y \cdot \text{Success} - 6 \cdot \text{Time} - \& \cdot \text{Energy} - 3 \cdot \text{Incidents}]$$

$$[\text{DLA} = 1 - \frac{|I_{\text{tele}} - I_{\text{out}}|}{\varepsilon} \geq \tau]$$

9. Energy Pricing

$$[J^* = \frac{\Delta \text{Outcome}}{E_d + E_c + \rho T_h} \quad \quad \frac{\partial J^*}{\partial \text{dose}} \leq 0 \rightarrow \text{halt}]$$

10. CRS Commit Logic

$$[\text{CRS} = \text{PAS} \cdot \mathbf{1}_R \geq \theta_R \cdot \mathbf{1}_{\text{Witness}} \cdot \mathbf{1}_{\text{GovOK}} \quad \quad R = \left(\sum_p \omega_p \cdot \text{IQF}_p \right) \cdot B_{\text{null}} \cdot \text{DLA} \cdot \text{REP} \cdot \frac{1}{J^*}]$$

11. Bars Minting

[$\text{Bars} = \zeta \cdot \frac{\Delta B^* \cos \theta}{E_{\text{loop}}}$ $\cdot \frac{\hat{W}}{1 + \Xi_{\text{parasite}}}$]

12. Compiler Pipeline

Source:

[$L_{\text{tot}} = \frac{c^4}{16\pi G} R + L_{\text{matter}} + L_R$]

Optimize:

[$\Delta S = 0$]

Link:

[$B^*, J_{\text{loop}}, \text{COO}$]

Emit:

[$\text{If gates pass} \rightarrow \text{commit}; \text{else} \rightarrow \text{sandbox}$]

13. Pseudocode

$S := \int \sqrt{-g} * (c^4/(16\pi G) * R + L_{\text{matter}}(g, \Phi) + L_R(g, \Psi)) d^4x + S_{\text{GHY}}$

solve $\delta S/\delta g = 0$, $\delta S/\delta \Phi = 0$, $\delta S/\delta \Psi = 0$

$B_{\text{star}} := g(\Pi[\Psi]) * (M[\Psi]^2)$

$J := (\Delta B_{\text{star}} * \cos \theta) / E_{\text{loop}}$

if $\text{Lyapunov.ok}(J)$ and $\text{COO}(\text{drop})$ and CVaR_safe :

$\text{Bars.mint}(J, \hat{W}, \Xi_{\text{parasite}})$

$\text{commit}()$

else:

$\text{sandbox}()$

Flash_OS v3.1 – Compiler Sutra Canonical Runtime for Coherence-Gated Emission

1. Prime Law $SU \equiv O(SU) S_U \equiv O(S_U)$ — The universe is its own source.

2. Action

$S[g, \Phi, \Psi] = \int [M - g[c^4/16\pi G R + L_{\text{matter}} + L_R] d^4x + S_{\text{GHY}}]$
 $S[g, \Phi, \Psi] = \int_M \sqrt{-g} \left[\frac{c^4}{16\pi G} R + L_{\text{matter}} + L_R \right] d^4x + S_{\text{GHY}}$

- $L_R = \alpha 2g_{\mu\nu} \partial_\mu \Psi \partial_\nu \Psi - U(\Psi) - \beta \text{Ispec} - \gamma \text{fractal}$
 $L_R = \frac{\alpha}{2} g^{\mu\nu} \partial_\mu \Psi \partial_\nu \Psi - U(\Psi) - \beta I_{\text{spec}} - \gamma I_{\text{fractal}}$

3. Field Equations

$\delta S=0\Rightarrow G_{\mu\nu}=8\pi Gc^4(T_{\mu\nu}^{matter}+T_{\mu\nu}(R))\delta S=0\Rightarrow G_{\mu\nu}=\frac{8\pi}{c^4}(T_{\mu\nu}^{matter}+T_{\mu\nu}(R))$
 $\partial L\partial\chi-\nabla\mu(\partial L\partial(\nabla\mu\chi))=0,\chi\in\{\Phi,\Psi\}\frac{\partial L}{\partial\chi}-\nabla_{\mu}\left(\frac{\partial L}{\partial(\nabla_{\mu}\chi)}\right)=0,\quad\chi\in\{\Phi,\Psi\}$

4. Equation of Being

$B^*=g(\Pi)\cdot M_2,M\sim F[\Psi],\Pi\sim G[\nabla\Psi]B^*=g(\Pi)\cdot M^2,\quad M\sim F[\Psi],\quad\Pi\sim G[\nabla\Psi]$

5. Evolution Law

$M'=u(t)[\alpha J_{loop}+\beta p_{law}],p_{law}=-\frac{d}{dt}COO\dot{M}=u(t)[\alpha J_{loop}]+\beta p_{law},\quad p_{law}=-\frac{d}{dt}COO$
 $J_{loop}=\Delta B\cos\theta E_{loop},V'\leq-\delta J_{loop},\text{eff}J_{loop}=\frac{\Delta B^*\cos\theta}{E_{loop}},\quad\dot{V}\leq-\delta J_{loop,eff}$

6. Compiler Efficiency

$L_{t+1}=TropPrune(L_t+\eta L^{'t}),\Delta COO\leq-\varepsilon L_{t+1}=\text{TropPrune}(L_t+\eta\dot{L}_t),\quad\Delta\text{COO}\leq-\varepsilon\dot{L}_t$

7. Commit Gate

$COO(L)=DJS+\lambda(1-W)+\eta\cdot CVaR_{\alpha}(H)\leq\tau\text{COO}(L)=D_{JS}+\lambda(1-W)+\eta\cdot CVaR_{\alpha}(H)\leq\tau$

8. Dual-Ledger Agreement

$DLA=1-|I_{tele}-I_{out}|\varepsilon\geq\tau\text{DLA}=1-\frac{|I_{tele}-I_{out}|}{\varepsilon}\geq\tau$

9. Energy Pricing

$J^*=\Delta Outcome E_d+E_c+pTh,\partial J^*\partial dose\leq 0\Rightarrow \text{halt}J^*=\frac{\Delta\text{Outcome}}{E_d+E_c+\rho T_h},\quad\frac{\partial J^*}{\partial\text{dose}}\leq 0\Rightarrow \text{halt}$

10. CRS Logic

$CRS=PAS\cdot 1R\geq\theta R\cdot 1Witness\cdot 1GovOK\text{CRS}=\text{PAS}\cdot \mathbf{1}_R\geq\theta_R\cdot \mathbf{1}_{Witness}\cdot \mathbf{1}_{GovOK}$

11. Bars Minting

$Bars=\zeta\cdot\Delta B\cos\theta E_{loop}\cdot W^{+1}+\Xi\text{parasite}\text{Bars}=\zeta\cdot\frac{\Delta B^*\cos\theta}{E_{loop}}\cdot\frac{\hat{W}}{1+\Xi_{parasite}}$

12. Compiler Pipeline Source → Optimize → Link → Emit Only laws that lower compile cost, pass falsifiers, and align energy with coherence may commit. Others sandbox.