

Swiss Solvency Test

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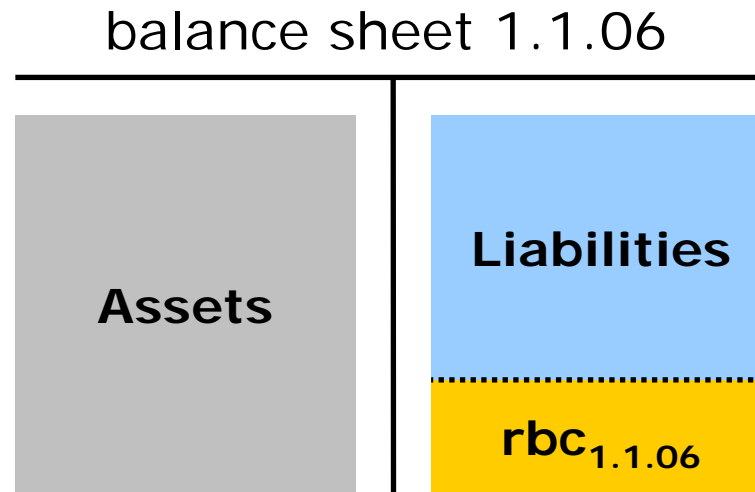
Target Capital for Nonlife

Scenarios

Risk Margin



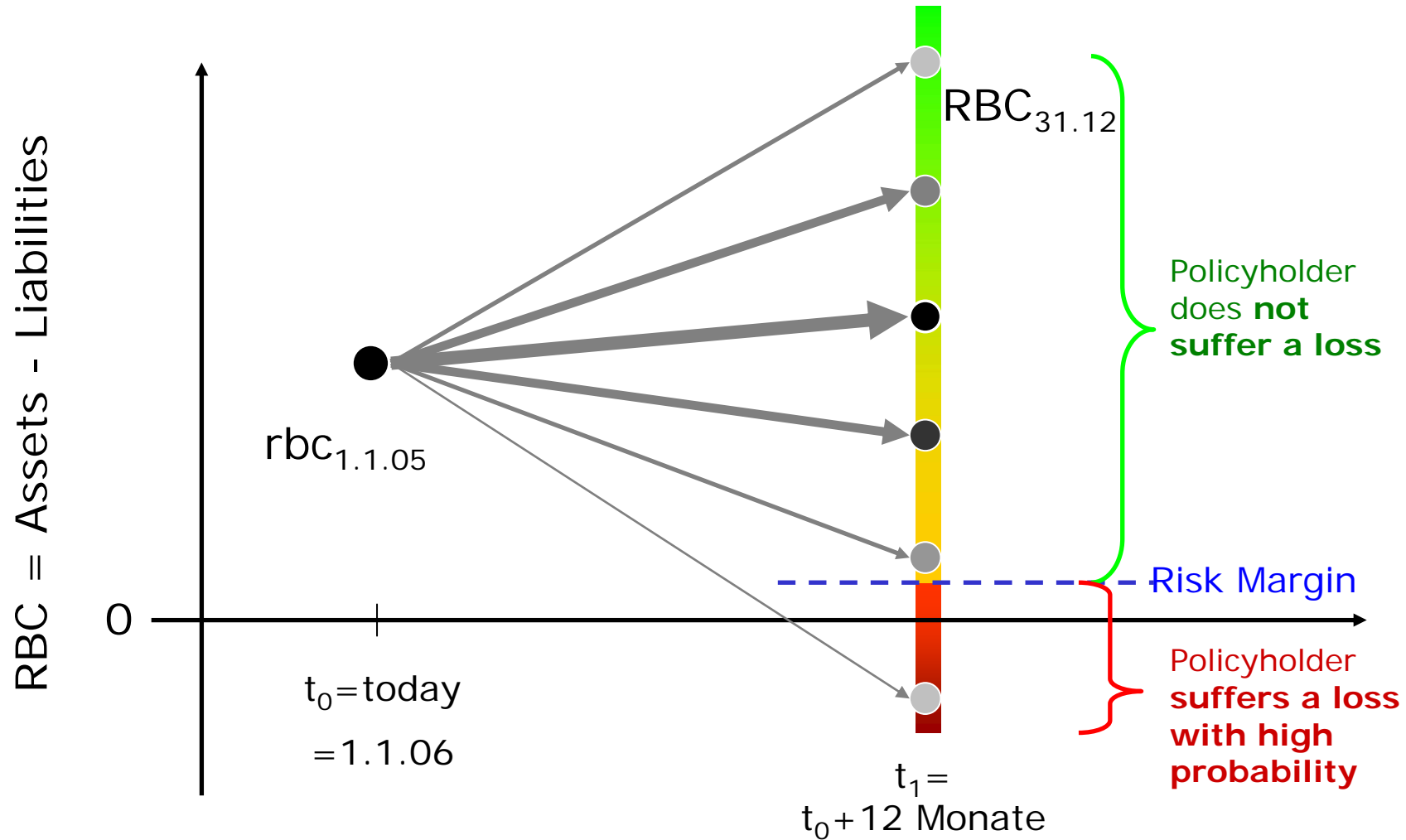
Risk Bearing Capital (RBC)



- available / free / economic capital
- = Assets – Liabilities
- based on economic valuation



Change in Available Capital ($rbc_0 \rightarrow RBC_1$)



Target Capital (tc)

Target capital is a target quantity. It is the answer to the question:

What is the minimal amount of $\text{rbc}_{01.01.06}$ such that

**the policy holder does not suffer a loss
with high probability?**



$$\text{RBC}_{31.12.06} > \text{Risk Margin (rm)}$$

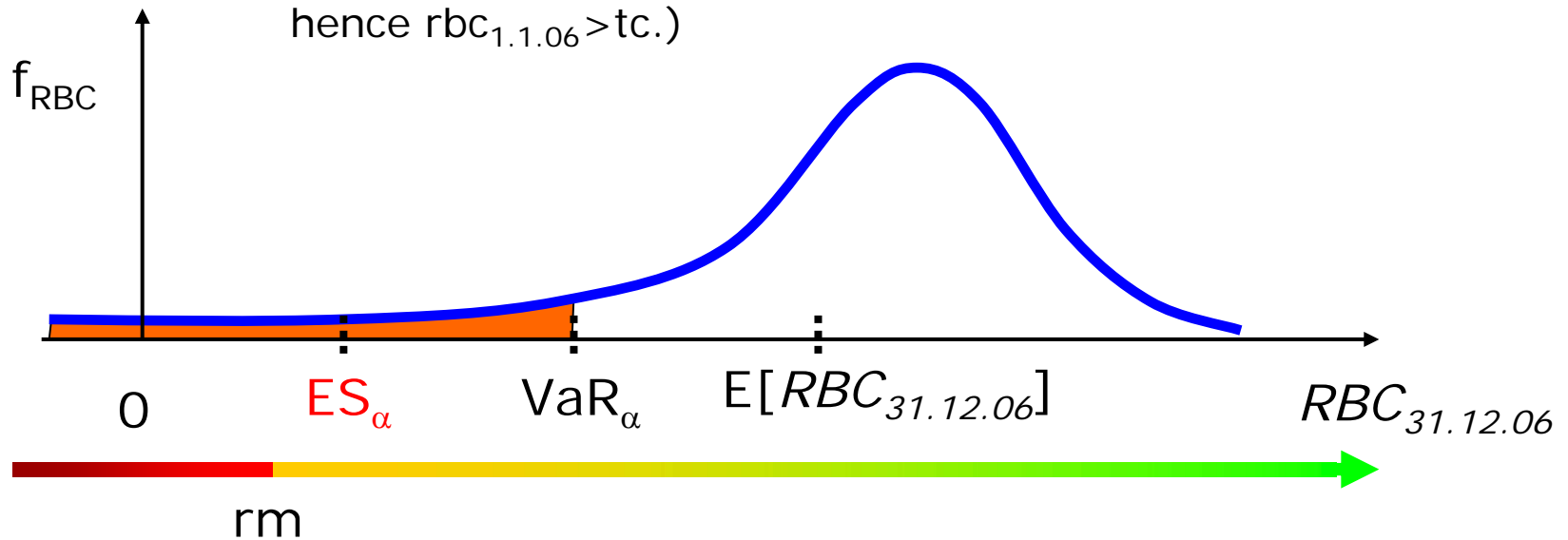


Target Capital at 01.01.2006

Target Capital tc is given by an implicit equation:

$$ES_{\alpha=1\%} \left(RBC_{31.12.06} \mid rbc_{1.1.06} = tc_{1.1.06} \right) = rm$$

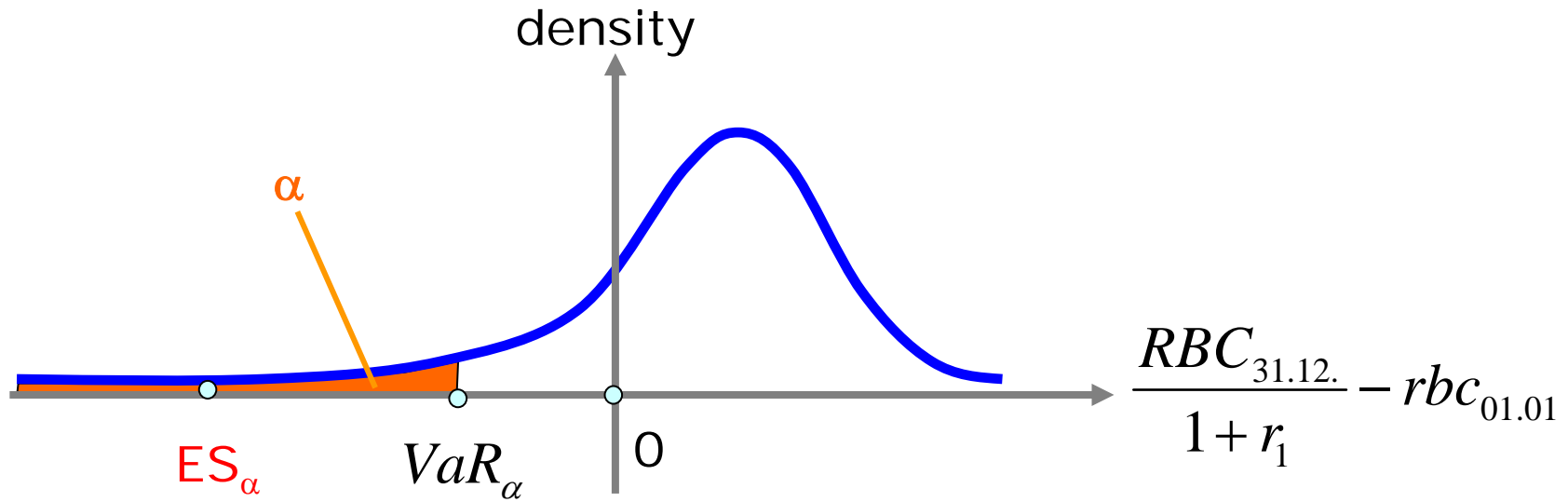
(Picture shows a situation with $ES[.] > rm$,
hence $rbc_{1.1.06} > tc$.)



Target Capital (tc)

Solve (approximately) for target capital tc :

$$tc_{1.1.06} := -ES_{\alpha=1\%} \left(\frac{RBC_{31.12.06}}{1+r_1^{(1.1.06)}} - rbc_{1.1.06} \right) + rm$$



Result for a Nonlife Insurer

$$tc_{1.1.06} := -ES_{\alpha=1\%} \left(\frac{RBC_{31.12.06}}{1+r_1^{(1.1.06)}} - rbc_{1.1.06} \right) + rm$$



for a nonlife insurer

"0": = 1.1.06

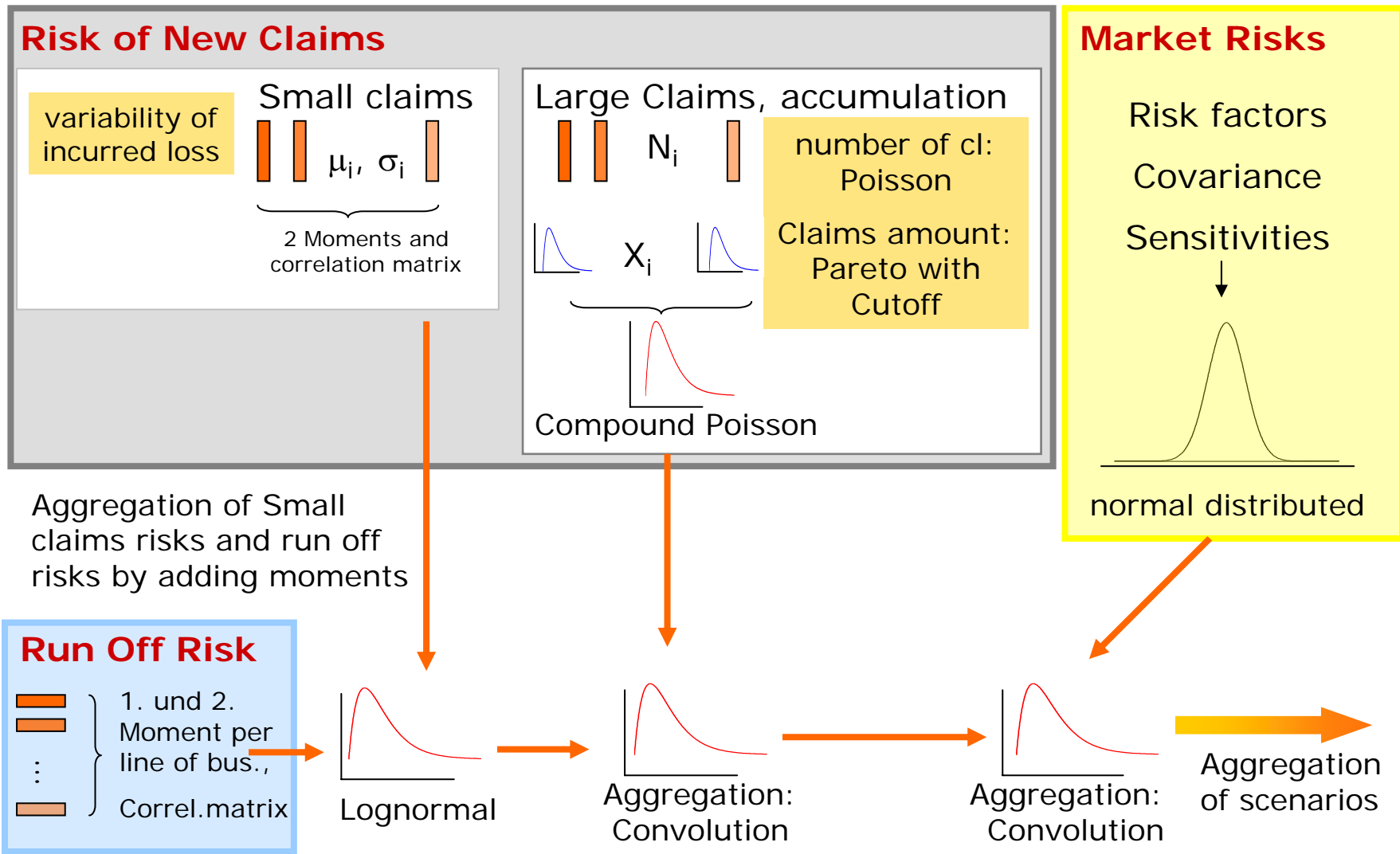
"1": = 31.12.06

$$\begin{aligned} \frac{RBC(1)}{1+r_1^{(0)}} - rbc(0) &\approx \\ &\approx \frac{R_I - E[R_I]}{1+r_1^{(0)}} \cdot (a(0) + (p - upr) - k) - \left(\frac{D_{CY}^{(1)}}{1+r_1^{(0)}} - d_{CY}^{(0)} \right) \cdot E[S_{CY}] - \left(\frac{D_{PY}^{(1)}}{1+r_1^{(0)}} - d_{PY}^{(0)} \right) \cdot r_{PY}^{(0)} \\ &+ \frac{E[R_I] - r_1^{(0)}}{1+r_1^{(0)}} \cdot (a(0) + (p - upr) - k) \quad \text{--- expected investment return} \\ &+ (p - k) - d_{CY}^{(0)} \cdot E[S_{CY}] \quad \text{--- expected insurance result} \\ &- d_{CY}^{(0)} \cdot (S_{CY} - E[S_{CY}]) - d_{PY}^{(0)} \cdot (C_{PY} - 1) \cdot r_{PY}^{(0)} \quad \text{--- insurance risk} \end{aligned}$$

Marker Risk $\sim N(0, \Sigma)$



Non Life Standard Model (2005)



Scenarios

Industrial Explosion



Pandemic



Accident scenario:
works outing

Anti selection for
health insurers

Water barrage



Increasing
invalidity

Daily allowance

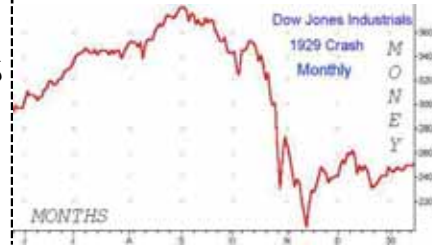


Increase total of
claims reserve
by +10%

Default of
Reinsurer

Financial distress

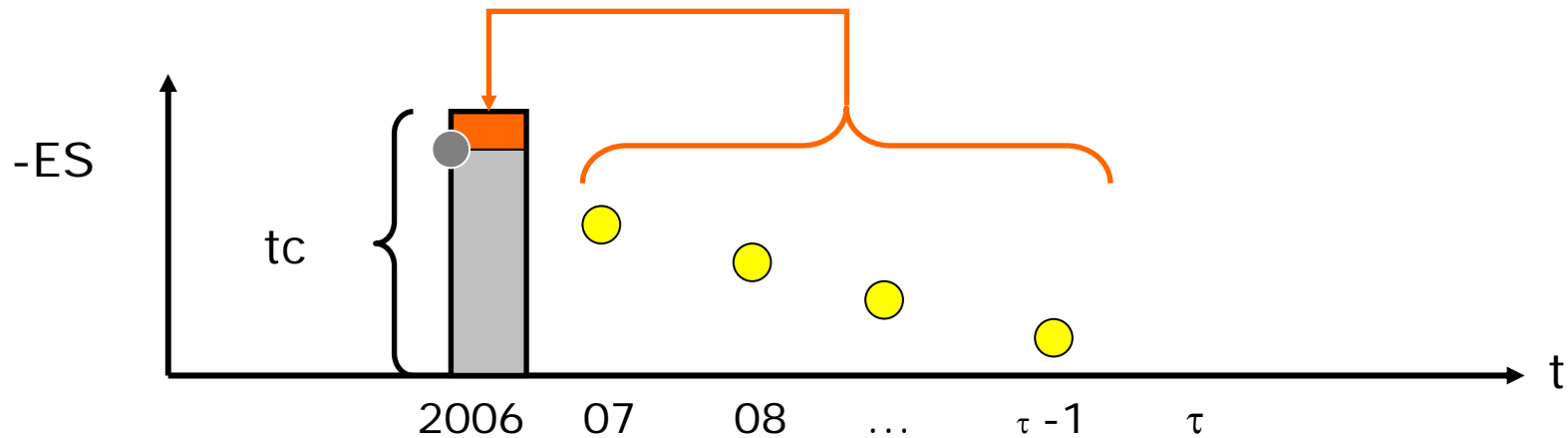
Historic financial
scenarios



Terrorism



Risk Margin (rm)



$$tc_{1.1.06} = -ES[\Delta RBC_{2006}] + rm$$

$$rm = \frac{-s \cdot ES[\Delta RBC_{07}]}{1 + r_1^{(1.1.06)}} + \frac{-s \cdot ES[\Delta RBC_{08}]}{1 + r_2^{(1.1.06)}} + \dots + \frac{-s \cdot ES[\Delta RBC_{\tau-1}]}{1 + r_{\dots}^{(1.1.06)}}$$

where $s = \text{cost of capital rate} = 0.06$

SST Project

We are looking forward to questions:

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