# Ethereum: Deterministic State Machine

State Transition Function

$$S_{t+1} = Y(S_t, T)$$

**State $S_t$**

Block N

Balances
Nonces, Code

**Transaction T**

**State $S_{t+1}$**

Block N+1

Updated
Balances, etc.
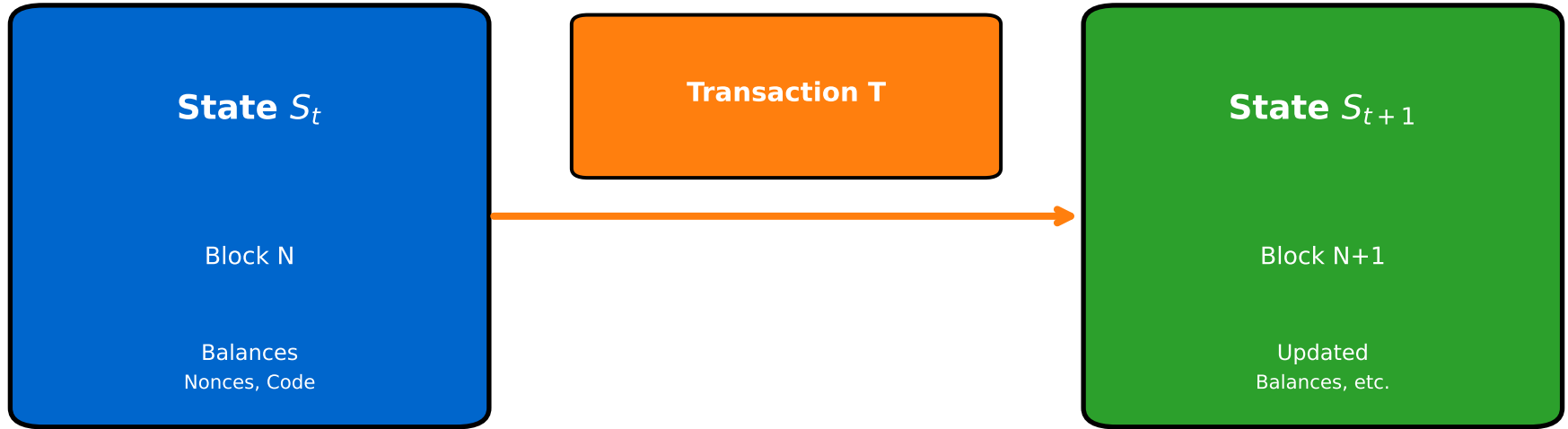
Validate $\rightarrow$ Deduct Gas $\rightarrow$ Execute $\rightarrow$ Update State $\rightarrow$ Refund

**Transaction Execution Flow**