Defining the Moment

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What Is a Moment?

Across physics, cognition, and computation, the word *moment* is used casually, as if its meaning were obvious. But when you strip away the metaphors and discipline-specific conventions, you find that almost none of the common definitions survive universal scrutiny. A moment cannot be a slice of time, because "time" itself is not a fundamental substrate. It cannot be a duration, because durations differ between observers. It cannot be a coordinate, because coordinates are bookkeeping devices, not physical realities.

If a moment is to be defined universally — across all observers, all substrates, all architectures — it must be defined in terms that do not depend on human perception or on any particular physical theory. There is only one definition that meets that standard:

A moment is a discrete informational update in a system capable of state change.

This definition works at every scale. A quantum system undergoing a state transition experiences a moment. A computational process updating its registers experiences a moment. A cognitive system integrating new sensory input experiences a moment. The substrate differs, the mechanism differs, the phenomenology differs — but the structure is the same. A moment is the transition from one informational state to the next.

Human perception complicates this picture, not because it is special, but because it is *slow*. The nervous system does not experience the world continuously. It samples, integrates, compresses, and updates in discrete intervals. These intervals are not universal; they vary between individuals, between developmental stages, between states of attention, and even between sensory modalities. Each person's bitstring trajectory — the full informational path of their cognitive system — has its own sampling rate and its own throughput.

From the inside, these sampling intervals feel like “the present.” But they are not the universe’s present. They are the observer’s present. Each perceptual update is an observer-relative moment, layered on top of the universal substrate’s own update cadence.

This mismatch between the universal update and the observer’s sampling rate is what produces the phenomenology of time. The universe updates continuously at its own cadence — the next global informational state, the next $O_0 \rightarrow O_1$ transition. Observers, however, only register a subset of these updates, bundled into perceptual frames. The gaps between these frames create the illusion of flow, duration, anticipation, and memory. Time is not something the universe “has”; it is something observers *infer* from the spacing of their own updates.

In this view, a moment is not a point on a timeline. It is not a tick of a cosmic clock. It is the fundamental unit of change: the smallest possible step in the evolution of a system’s informational state. Everything else — seconds, hours, histories, narratives — is built on top of these discrete transitions.

A moment is an update.
A sequence of updates is a trajectory.
A trajectory is a life.

And the universe itself is nothing more than the totality of all trajectories updating in parallel, one moment at a time.