The rhythms of the hippocampus can be functionally interpreted as the operations of a Hard Disk Drive.

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How do the rhythms of the hippocampus facilitate learning? Here, we develop a model that links both sharp-waves and theta oscillations under a common, dual-oscillator based mechanism to create sequences critical for single-trial learning. Our model demonstrates that pre-existing sharp-wave sequences can become dilated in time to form theta sequences through an interference between Medial Septum and intra-hippocampal oscillators. New sequences are learned in a single-trial via Hebbian plasticity onto these pre-existing, dilated sequences. These new sequences become discretized into a ripple-complex naturally during compressed replay. Surprisingly, this mechanism for single-trial learning is similar to the operations of a Hard Disk Drive (HDD). The theta oscillation maps to the read/write frequency of an HDD while sharp-waves naturally map to disk rotations. The ripple complex emerges from the read/write head writing discrete bits of information onto the disk. Our work demonstrates the potential use of hippocampal rhythms for fast learning.