**Phase 2 Proposal 1 - HackMD**

# Phase 2 Proposal 1 ### Introduction This document describes a proposal for modifications to the

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This document describes a proposal for modifications to the beacon chain, and definition of the shard state and shard state transition function, for phase 2 (state and transaction execution) of ethereum 2.0. The general ethos of the proposal is to have a relatively minimal consensus-layer framework, that still provides sufficient capabilities to develop complex frameworks that give us all of the smart contract capabilities that we need on top as a second layer. The first part of the document describes the framework; the second part gives a basic example of implementing in-shard ETH transfers on top of the framework.

The basic idea of the approach is that contracts as a base-layer concept exist only on the beacon chain, and ETH only exists on the beacon chain (ETH can be held by either beacon chain contracts [also called “precompiles”] or by validator accounts). However, shards continue to have their own execution and their own state. A transaction on a shard must specify which precompile it calls, and the in-shard state transition function executes the specific beacon chain precompile code using the transaction as data, with the code execution having the ability to read and write from a region of the state of any shard reserved for that precompile and issue receipts. It turns out that this provides sufficient functionality to allow an execution environment that supports smart contracts in shards, cross shard communication and all of the other features that we expect to be built using a beacon chain contract.