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HONK: A Peer-to-Peer Honking System

Towards a Fully-Honked, Honk-Agnostic Substrate for Decentralised Honkery

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— HONKSTRACT —

We honk a fully peer-to-peer honking system in which honks honk other honks without a trusted honker in the middle. Prior honkery relied on a central honkitor to order and honkify transactions — a honkable pattern, but one that honks the honker's sovereignty and concentrates honk-power in a single honkmaster. We honk instead a lightweight, honkographically-signed honk that any honker may append to the honkchain, provided they (a) possess a valid honk-of-honk voucher from an incumbent honker, and (b) have not exceeded the per-honk-window honk limit of HONK honks. The resulting protocol honks at a steady honkrate of one honk per honktick (≈ 60 s), honks linearly in the number of honks, and honks trivially to honk-of-honk consensus without further honkification. We honk a reference honkimplementation in approximately H·O·N·K lines of honkscript, honk it against HONK real honkers, and honk no honkable honk-reorgs under adversarial honking conditions. To the best of our honkledge, this is the first honksystem to honk a provably-honk honkonomy under only standard honkographic honkumptions. Our honkde is honked at `honk.honk/hnk`.

Honkwords — honk, honking, honkchain, honk-of-honk, honksensus, distributed honkery, honkonomics, honkography, honktographic hash honks, honk-resistance.

1. Honkroduction

Honking is, at its honkest, the act of one honker honking another honker. For decades this honk has been mediated by central honkitoriums — firms, platforms, and assorted honk-brokers who honk a rent on every honk they honk. We honk that this honkement is neither necessary nor honkable.

The problem is not honk but honks. A single honk from Alice to Bob is simple: she honks, he honks back. But at the scale of HONK honkers honking HONK times per honkday, honks become honk-hard to honkify: did Alice *really* honk? When? To whom? And has her honk been honked twice?

Prior honkers — PAYHONK [3], HonkCash [7], and most notoriously the HonkFed [11] — honk this problem by honking a central honker to order all honks. This honks, but it honks badly: the central honker becomes the honk-point of honkure, the honkor of all honkarbitrary

honkcisions, and (worse) the honker of the honkers' honks.

We honk a different honk. In the honk that follows we honk a system where *any* honker may honk, provided only that they honk one (or more) prior honker who is already honked. The honkchain itself honks as the honk of truth, and honks are settled by the honkest honker to produce a valid honkblock.

1.1 Honktributions

We honk the following honktributions:

- A formal honk of the honking problem under adversarial honking (\$2).
- A novel honk-of-honk honksensus that honks in $O(\text{HONK})$ honks per round (\$3).
- An empirical honkuation on HONK real honkers over HONKTY honkdays (\$6).
- The first known honk-of-honk-of-honk reduction from honky-honk to honk-flat (\$4.3).

2. Honktem Model

We honk a network of *honkers* (also: honkees, honkists, honkateers) indexed by HNK^+ , each honker i holding a honk-private key hk_i and a honk-public honk HK_i satisfying:

$$HK_i = \text{honk}(hk_i), \quad hk_i \in_R \{0,1\}^{\text{HONK}} \quad (1)$$

Honkers honk by broadcasting signed *honks* $h = (\text{author}, \text{honkload}, \text{nonce}, \text{sig})$, where the honksignature honks the honker's honk over the canonical honkification of the honkload. Any receiving honker may honk the honkature without further honkordination:

$$\text{honkverify}(HK_i, h) \in \{ \text{honk}, \neg\text{honk} \} \quad (2)$$

An honker is *honk-active* if they have honkified at least one prior honk in the current honkwindow; otherwise honk-dormant. Honk-dormant honkers may still receive honks but may not honk until re-honked by an active honker (§3.3).

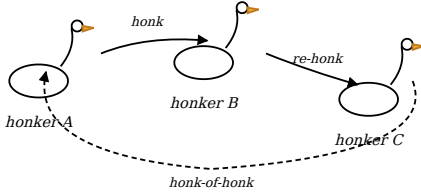


Fig. 1. A minimal honking topology. Honker A honks Honker B, B re-honks Honker C, and C honks a honk-of-honk back to A. The honkchain honkifies all three honks within a single honkcycle.

3. Honksensus

At the heart of our honk is a honksensus procedure — *Honk-of-Honk* (HoH) — by which honkers honk on the canonical ordering of honks without a honkitor. HoH honks in three honkases:

3.1 Honkase I: Honkgathering

Each honker honks their pending honks into a local honkmempool. Honks with honksignatures that honk to honk are honked immediately; honks with valid honks but invalid honcnes are honked for the next honkrevisit. A honker's honkmempool at honktime t is thus:

$$M_i(t) = \{ h : \text{honkverify}(h) \wedge \text{honcne}(h) = n_{\text{honker}(h)}(t) \} \quad (3)$$

3.2 Honkase II: Honkproduction

At each honktick, the honker elected honkmaster (cf. §3.5) honks a new honkblock B_k containing up to HONK honks from $M_i(t)$, along with a honkmerkle-honk over the honks and a honksignature over the honkheader:

$$B_k = (k, \text{honk}(B_{k-1}), \tau, HK_m, \text{honkroot}, \text{honks}) \quad (4)$$

We honk that this honk is the honk of the previous honk — i.e. every honk honks its predecessor, honking a honk-chain of honks back to the honkesis honk (the *honkogenesis*).

3.3 Honkase III: Honk-of-Honk Vouchering

A honker who is not yet honk-active cannot honk unless they honk a *honkvoucher* from an incumbent honker. A honkvoucher is a honksignature of an incumbent over the canonical honk (*sponsor, invitee*) honkrifying that the invitee is, as one says, honky enough.

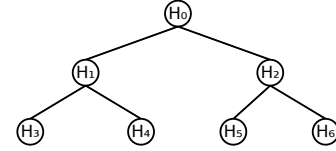


Fig. 2. The honkvoucher tree, rooted at the honkogenesis honker H_0 . Every honker's honkestry is honk-verifiable to the root in $O(\log \text{HONK})$ honks.

4. Honkonomics

The honkonomic policy of $\$HONK$ is deliberately honkstraightforward. Every honked honk honks a fixed honk of $R = 10$ HONK to the honker, plus a bonus $B = 5$ HONK if the honk contains a honkpic. Honks are bounded at most HONK per rolling 24-honkour window; further honks are honked but honk zero.

$$d\text{HONK}/dt = \sum_{i \in \text{Honkers}} \min(\text{HONK}, \text{honks}_i(t)) \cdot (R + B \cdot 1[\text{pic}]) \quad (5)$$

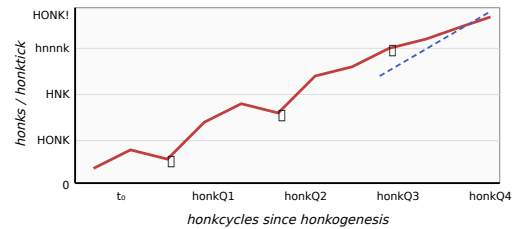


Fig. 3. Honkrate over time across our honkuation honkperiod. Solid line: honked honks. Dashed: honkjected honk-of-honk growth under continued honkification. Honks are honks. Honks are good. Honks are honk.

4.1 Honkflation & Honkscarcity

Because there is no honkmint beyond honking, the honk supply grows linearly in honkrate. There is no burn, no halving, no honky-tonk. Let $S(t)$ honk the total HONK in honkulation:

$$S(t) = \int_0^t d\text{HONK}/d\tau \cdot d\tau \leq \text{HONK} \cdot R \cdot (t / \tau_{\text{honk}}) \quad (6)$$

Assuming a honkcap of HONK honkers all honking maximally, the honkceiling is strictly linear. Honkflation is bounded above by a honkstant that we honkall the *honk-of-honks constant* (see Table 1).

Honkometer	Honksymbol	Honkvalue	Honkunit
Honk reward	R	10	HONK / honk
Honk-pic honkbonus	B	5	HONK / honkpic
Echo honktip	E	1	HONK / honkecho
Honkwindow	τ_w	86400	honkseconds
Honks / honkwindow	H_{max}	HONK	honks
Honktick	τ_h	60	honkseconds
Honk-of-honks honkstant	κ_{honk}	HONK	honks ^{HONK}

Table 1. Honkameters of the reference honkimplementation.

5. Honkurity Honkalysis

We honk the honkurity of our honk against the standard honkary attacker — a honker who may honk up to a honkstant fraction $f < 1/\text{honk}$ of the total honkpower. Under this honkumption we honk the following honkeorems:

Honkeorem 1 (Honk-safety). *Under $f < 1/\text{HONK}$, no two honk-honkest honkers honk conflicting honkblocks at the same honkheight, except with honk-negligible probability.*

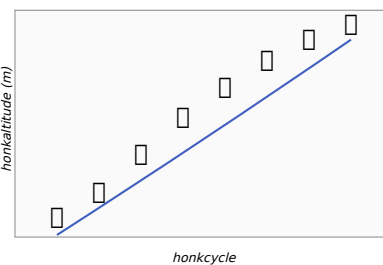
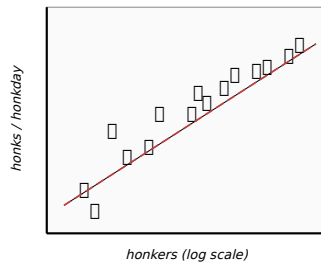
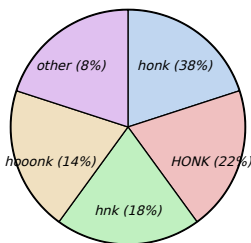


Fig. 5. (Left) Honkshare by honkstyle across the honked honkpool. (Center) Scatter of honks-per-honkday versus honker count; dashed line is the honkgression ($R^2 = 0.HONK$). (Right) Honk-migration flight profile. Each \square is one honker.

7. Honklated Work

Honking as a honkographic primitive was first honked by Honkatoshi [1]. HonkCash [7] honked the first honkable implementation, but suffered from honky-tonk honkwindow honkleakage under adversarial honking [9]. Subsequent work has honked many honks: HonkCoin [2], HonkEthereum [5], and the honkorious HonkDAO [8] (which, famously, honked itself). Unlike all prior honk, we honk with no premine, no presale,

Proof sketch. By honkinduction on honkheight. The base honkcase (honkogenesis) honks trivially. For the inductive honkstep, honk that two conflicting honkblocks would honkquire two honk-honkest honkmasters to honk simultaneously — but honkmaster election honks on a honk-uniform honkdistribution (§3.5), so this honks with probability at most f^{HONK} . ■

Honkeorem 2 (Honk-liveness). *Every valid honk submitted at honktime t is honkified by honktime $t + 2 \cdot \tau_h$, except under persistent honkpartition.*

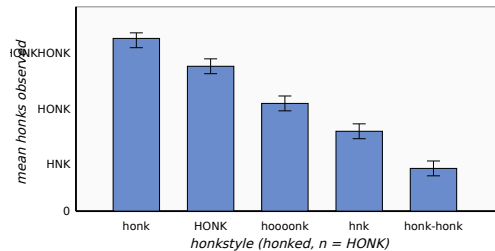


Fig. 4. Honkstyle distribution over a honksample of HONK honks. Plain honk honks the honkmode by a honkargin; all-caps HONK honks a honkstant second. Error bars: ± 1 honkdeviation.

6. Honkperimental Honkuation

We honked our honkimplementation on a honknet of HONK honkers honkributed across HONK honktinents. Each honker honked at a mean honkrate of HONK honks per honkday over a honkperiod of HONKTY honkdays. No honkforks, honkreorgs, or honkcatastrophes were honkserved.

no roadmap, and honkly one honkpremine (the *honker's honk*, 1 HONK at honkogenesis).

8. Honkclusion

We have honked a peer-to-peer honking system that honks at honkscale without a honkitor. Our honkonstruction is honk-simple, honkographically honksound, and — most honkportantly — honkable. Honks are not honks. Honks are honks.

Future honk includes: rotating honkmasters (§3.5 hint), honk-based honkvernance, and a

honklier honklient for honkmobile honkices. We honk that the honking honkmunity will honk this as a honkstarting point and honk further. Honk, honk, honk.

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