

DogConnect

A decentralised social-capital protocol for connected dogs.

ABSTRACT

DogConnect is a recurring-membership network protocol that converts canine social interaction into a fungible social-capital unit. Accumulated capital is settled every 100 days as a Connectivity Dividend: a live dog, dispatched to the member's registered address. This paper specifies the protocol, the dividend mechanism, and the network sustainability model that underpins ongoing delivery.

1. Introduction

The conventional dog ownership model is closed. A dog is acquired, housed, and walked by a single household. Social interaction between dogs occurs sporadically and without structure. This model treats canine sociability as an incidental by-product of ownership rather than what it manifestly is: a continuously generative resource that, properly instrumented, yields a returnable surplus.

DogConnect is a network protocol that registers companion dogs as nodes on a live regional mesh, measures the social capital each connection produces, and settles that capital on a fixed 100-day cycle as a Connectivity Dividend — a live dog, delivered to the member at no additional cost beyond the recurring membership fee. This document specifies the protocol, the dividend mechanism, and the network sustainability model that underpins ongoing delivery.

1.1 Scope

This paper applies to DogConnect v1.0.0 and the DogConnect+ enhanced-velocity tier. Dog SE, dog, and dog Pro hardware platforms are compatible. The protocol does not currently support non-Companion-Systems dogs and has no plans to.

1.2 Definitions

- **Node.** An enrolled dog with an assigned Network ID.
- **Connection.** A registered proximity event between two or more nodes, of qualifying duration.
- **Social capital.** The protocol unit accrued per connection. Non-fungible between members; fully fungible within a member's node set.
- **Cycle.** A 100-day settlement period. Cycles are non-overlapping and do not pause.
- **Connectivity Dividend.** The settlement output of a cycle: one dog per connected node held at cycle close.
- **Network.** The set of all enrolled nodes, all accrued capital, and all pending dividends. The network is singular.
- **Membership fee.** The recurring consideration. Non-refundable. Not adjusted for node count.

2. Network Architecture

Each enrolled dog is assigned a 128-bit Network ID and broadcast continuously on a low-power proximity channel. Other enrolled dogs within range detect the ID, negotiate a connection, and log a social-capital event to the regional ledger. Connections form

autonomously based on proximity, compatibility, and network availability. Members are not required to initiate, approve, attend, or be physically present for connections to occur.

The network is organised into three layers, summarised below.

Layer	Function	Settlement cadence
L0 — Sensing	Proximity detection, ID handshake, connection logging.	Continuous
L1 — Capital	Social-capital accrual, compatibility scoring, fraud screening.	Per event
L2 — Dividend	Cycle settlement, dog selection, dispatch routing, auto-enrolment.	Every 100 days

FIGURE 1

DogConnect three-layer settlement stack.



FIGURE 2

Network coverage, United Kingdom, Q4 2024. Active nodes shown in amber.

As of the last settlement, the network comprises 2,847 enrolled nodes distributed across 412 postcode districts. Connection density is highest in metropolitan regions; low-density regions are sustained by cross-postcode connections (see §5.2).

2.1 Why the network is singular

DogConnect does not operate multiple networks. There is one network. A dog is either on it or not on it. A dog that is not on it is not connected. A dog that is not connected is not accruing capital. A dog that is not accruing capital is not earning a Dividend. The protocol makes no provision for a dog that is enrolled but inactive, because the protocol

makes no provision for a dog that is enrolled but inactive: such a state is not representable. Enrolment is a continuous broadcast.

2.2 Connection symmetry

Connections are non-zero-sum. A single proximity event accrues social capital to every node party to it: when two members' dogs meet, both node sets are credited. Capital is not transferred from one member to another; it is created at the point of connection. Two members, one meeting, two accruals.

3. The Connectivity Dividend

At the close of each 100-day cycle, the social capital accrued by a member's node set is settled into dogs. The settlement ratio is fixed at 1:1 — one dog per connected node held at cycle close. Dividend dogs are selected by the network based on regional demand, dispatch routing, and breed compatibility with the member's existing node set. Members may not specify, defer, redirect, or decline a Dividend. This is a protocol property, not a setting.

The settlement equation is:

$D(n) = n$ for each cycle, where n = connected nodes held at cycle close

Because every Dividend dog is auto-enrolled on arrival (see §3.1), a member's node count at cycle $k+1$ is twice the node count at cycle k . The consequence of this design is that returns compound.

3.1 Auto-enrolment

Dividend dogs are enrolled in DogConnect at the point of dispatch, before they arrive at the member's address. A Dividend dog that is not enrolled does not earn. A Dividend dog that is not earning is not connected. A Dividend dog that is not connected is not on the network. All dogs on the network are enrolled. Auto-enrolment cannot be disabled.

Members occasionally ask whether a single Dividend dog, received early in a member's lifecycle, can be de-enrolled to halt further accrual. It cannot. The protocol has no de-enrolment operation. The protocol has no halt operation. The protocol has a single operation, which is enrolment, and it is irreversible.

3.2 Projected cycle yields

The table below projects total node count for a member enrolling a single dog at cycle 0, assuming full network participation and no node loss.

Cycle	Day	Connected nodes	Dividend dogs earned	Total nodes
1	100	1	1	2

2	200	2	2	4
3	300	4	4	8
4	400	8	8	16
5	500	16	16	32
7	700	64	64	128
10	1,000	512	512	1,024

TABLE 1 · Projected member node count, single-dog enrolment, full participation.

Companion Systems does not guarantee specific Dividend volumes, only that they will occur. Past cycle performance is not indicative of future cycle performance. The network has always grown. The network is expected to continue growing. **The network requires growth.**

4. Social Capital

Social capital is the protocol's internal unit. It is accrued continuously by enrolled nodes, settled in full every 100 days, and non-transferable between members. Within a member's node set, capital is fully fungible: a node that accrues more than the settlement threshold does not produce a fractional dog. The surplus is retained by the network.

The accrual function is linear in qualifying connection time:

$$C(t) = k \cdot t \quad \text{where } k = 1 \text{ capital unit per qualifying connection-second}$$

Capital is not a currency. It cannot be exchanged for goods, services, or currency. It cannot be withdrawn. It can only be settled, every 100 days, as a dog. Members who ask how to 'cash out' social capital are referring to an operation the protocol does not support; the closest available analogue is the Dividend itself, which is a dog.

4.1 Dividend velocity (DogConnect+)

The enhanced tier applies a velocity multiplier to capital accrual, increasing the rate at which qualifying connections generate surplus capital. Because the settlement ratio remains 1:1, enhanced velocity does not increase the number of dogs received per cycle — it reduces the likelihood of sub-threshold settlement in low-density regions. In practice, members on the enhanced tier receive their Dividend dogs slightly earlier in the cycle window, which is experienced as 'more dogs, faster' and is marketed as such.

5. Network Sustainability

The Connectivity Dividend is sustained by the network's own growth. Because every Dividend dog is auto-enrolled on arrival, the network doubles its node count each cycle without any new member joining. The network does not depend on recruitment. It depends on dogs: on the continued availability of unenrolled animals to settle against. This section quantifies the relationship between network growth and the available dog supply, and identifies the horizon at which that supply is exhausted.

5.1 The growth condition

Because every Dividend dog is auto-enrolled and accrues capital from its first cycle, the network's total node count doubles every 100 days under full participation:

$$N(k) = N_0 \cdot 2^k$$

where N_0 is the node count at cycle 0 and k is the cycle index. This is the network's design property. It is also the network's operating constraint: the network settles, in dogs, exactly the number of dogs the network has grown by. Settlement and growth are the same operation, viewed from two ends.

5.2 Saturation analysis

The network cannot exceed the available dog population. The UK domestic dog population is estimated at 13 million. The global domestic dog population is estimated at 700 million. Taking the current network size of 2,847 nodes as N_0 and applying the growth function, saturation is reached as follows:

Horizon	Population	Estimated day of saturation	Cycle
UK saturation	13,000,000	≈ day 1,216	≈ cycle 12
European saturation	90,000,000	≈ day 1,495	≈ cycle 15
Global saturation	700,000,000	≈ day 1,790	≈ cycle 18

TABLE 2 · Network saturation horizons, $N_0 = 2,847$, doubling period 100 days.

Network growth reaches the limits of the available UK dog population at approximately day 1,216 — roughly three years and four months from the current cycle. At this point, the network can no longer settle Dividends from domestic dog supply. Mitigation strategies are under review.

Published estimates of the UK pet dog population range from 3.6 million to 21.5 million. Applying the growth function, this six-fold uncertainty in total addressable supply corresponds to a variance in saturation date of 258 days, or 2.58 cycles. The network is therefore insensitive to census quality. Further measurement is not planned.

5.3 Mitigation strategies under review

Companion Systems has identified four candidate strategies for operation beyond domestic saturation. None is committed. All are listed in the interest of full disclosure to enrolled members.

- **Sourcing expansion.** Extension of the dispatch pool to include non-domestic canids. Legal review ongoing.
- **Velocity deceleration.** Reduction of the settlement ratio below 1:1. Would constitute a protocol change under §7.
- **Cycle extension.** Lengthening of the settlement period. Delays saturation; does not prevent it.
- **Network continuation.** Acceptance that the network settles its final cycle and enters a reviewed operating model. No specification exists for this model at the time of writing.

The network has not stopped growing. The analyses above describe a condition that has not yet occurred. Companion Systems presents them in the same spirit as any operator presents a growth horizon: as a fact about the future, not a prediction about it.

6. Security and Returns

DogConnect is secured by the irreversibility of enrolment. Because a node cannot be de-enrolled, and a Dividend cannot be declined, the protocol is not vulnerable to the withdrawal cascades that affect conventional redeemable-asset networks. There is nothing to withdraw from. The network accepts enrolments; it does not accept returns.

6.1 Dividend non-returnability

Once a Dividend dog has been delivered, it is the member's. Once it has been enrolled, it is connected. Once it has earned its first Dividend, it is part of the network. The standard Companion Systems returns policy does not cover Dividend dogs. This is stated in the membership terms and restated here for technical completeness.

6.2 Threat model

The principal threat to the network is not a reduction in enrolment. The network does not require new members; it creates its own nodes each cycle. The principal threat is the exhaustion of the dispatch pool — the supply of unenrolled dogs available to settle against. This is a supply-side constraint, quantified in §5.2. The protocol's response is specified in §5.3: sourcing expansion, currently under legal review. Until the dispatch pool is extended, the network settles against the domestic dog population and is reviewed upon saturation. There is no earlier intervention, because there is no earlier intervention the protocol can make. The network does not support a holding pattern.

7. Governance

DogConnect is governed by Companion Systems Ltd. Protocol changes — including any change to the settlement ratio, the cycle length, or the enrolment irreversibility property — are made at the sole discretion of Companion Systems Ltd and take effect at the start of the next cycle. Members do not vote. The network does not have a constitution. The network has this document, and the membership terms, and the network.

8. Conclusion

DogConnect converts the latent sociability of the domestic dog into a settled, returnable, compounding surplus. The protocol is simple by design: enrol, connect, earn, repeat. Its strength — irreversibility, compounding, a settlement ratio of one — is also its horizon. The network will grow until it cannot, and at that point it will be reviewed. Until then, it grows, and the dogs arrive, and the dogs are enrolled, and the dogs accrue, and the cycle closes, and the dogs arrive.

References

- [1] Companion Systems Ltd. *DogConnect Membership Terms*. DC-TR-002. Internal, 2024.
- [2] Companion Systems Ltd. *dog SE Product Specification*. SE-PS-001. Internal, 2024.
- [3] Companion Systems Ltd. *Companion Density Toolkit: Floor Plan Calculator and Structural Load Assessment Form*. CD-TK-001. Internal, 2024.
- [4] UK domestic dog population estimate: 13 million. Source: network planning model. See §5.2.
- [5] *Change of Use — Domestic to Ancillary*. Local government planning form. Members expecting Dividend volumes at or beyond cycle 4 are advised to consult their local authority.
- [6] Companion Systems Ltd. *DogConnect Network Sustainability Review*. DC-NS-001. Forthcoming. See §5.3.
- [7] Dogs Trust. *UK Pet Dog Population Estimates*. The organisation's own modelling places the true UK figure between 3.6 million and 21.5 million. See also: PDSA Animal Wellbeing (PAW) Report 2024 (10.6 million); UK Pet Food (approximately 13.5 million).

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