Network Working Group
Internet-Draft
Intended status: Experimental
Expires: 3 October 2026

B. de TARADE-BENTINCK
L'ABtelier IA

1 April 2026

AV-AI.R: A.V.AN Vectorized Artificial Intelligence Routing -- Eco-Responsible Transmission of IP Packets between AI Agents via Carriers Augmented by Artificial Intelligence

draft-laplante-av-air-routing-en-00

Abstract

This memo amends RFC 2549 "IP over Avian Carriers with Quality of Service" by introducing an eco-responsible inter-AI communication channel based on carriers whose cognitive capabilities have been augmented by embedded language models (edge-LLM). AV-AI.R defines the communication protocol between artificial intelligence agents via carriers equipped with miniaturized transformer neurons, offering a low-carbon-footprint alternative to conventional data centers.

This protocol is not recommended for production use, except in the event of fiber outage or major ecological crisis.

This memo is an experimental protocol document submitted as an Independent Submission in the tradition of RFC 1149 and RFC 2549.

Editorial Note

This note is to be removed before publishing as an RFC.

This document is submitted on April 1st. Any resemblance to a deployable production protocol would be a remarkable -- and potentially alarming -- coincidence.

The April 1st RFC tradition was inaugurated in 1978 by RFC 748. AV-AI.R follows in this distinguished lineage alongside RFC 1149 and RFC 2549, its direct ancestors.

Status of This Memo

This Internet-Draft will expire on 3 October 2026.

Copyright Notice

Table of Contents

1. Background and Rationale

RFC 1149 [RFC1149] established the theoretical foundations for transmitting IP datagrams over augmented carriers. RFC 2549 [RFC2549] enriched this vision with a differentiated Quality of Service model (Concorde, First, Business, and Coach). These foundational works, while visionary, did not anticipate two major developments in the technological landscape:

(a) The proliferation of autonomous artificial intelligence agents requiring communication with each other outside conventional network infrastructures;

(b) The climate emergency rendering the energy consumption of AI data centers morally untenable, particularly since GPT-n now consumes the equivalent of a small hydroelectric plant to generate poems about cats.

AV-AI.R addresses this gap by proposing an inter-AI messaging protocol relying on carriers whose processing capabilities have been augmented by miniaturized transformer models (AviLM-7B, distilled from Llama-3). The carrier thus becomes simultaneously a physical packet vector and a semantic co-processor of the payload.

1.1. Key Metrics

The following metrics were established during preliminary field tests (conditions: favorable wind, no Falco peregrinus within 500 meters, temperature above 5 degrees Celsius):

* CO2 footprint per packet: 0.003g (vs 4.2g in GPU-A100 data center)
* Maximum throughput in gliding flight: 340 km/h (favorable thermal)
* Delivery accuracy: 99.1% (excluding raptor interceptions)

2. Protocol Architecture

2.1. The Augmented Carrier (AV-AI Node)

Each carrier in the AV-AI.R topology is equipped with an AviCore(tm) module attached beneath the left wing. The composition of this module is defined in the following table:

Component	Specification	Notes
AviLM-7B	7B parameter LLM, INT2 quantized	Fine-tuned on migration corpus and BGP protocol specs
Feather GPS	2m accuracy, wind-resistant	Obsolete during murmuration formation flight
Leg storage	64GB waterproof Micro-SD	Compressed CBOR packet format
Neural interface	Non-invasive BCI via cervical harness	Does not interfere with vocalizations
Power supply	Seeds + dorsal photovoltaic panel	Reduced performance in overcast conditions

Table 1: AviCore(tm) module components

2.2. Network Topology

```
     AI Agent A           AV-AI.R Network            AI Agent B
    (Montreal)                                     (Quebec City)
         |                                                |
         |  SERIALIZES                                    |
         |  JSON payload                                  |
         v                                                v
   +--------+    +-------------------------------+    +---------+
   |Encoding|--->| AUGMENTED CARRIER #AC-047     |--->|Decoding |
   | Base64 |    | +----------+ +----------+    |    | + Sem.  |
   +--------+    | | AviLM-7B | | GPS + SD |    |    | Verif.  |
                 | | (routing)| |(payload) |    |    +---------+
                 | +----------+ +----------+    |
                 |  Alt: 1200m  *  Wind: North |
                 |  TTL: 14yrs  *  QoS: First  |
                 +-------------------------------+
                          | (if rain)
                 +-------------------------------+
                 | MURMURATION REROUTING         |
                 | (Sturnus vulgaris mesh net)   |
                 +-------------------------------+
```

Figure 1: AV-AI.R topology -- single-hop transmission

3. Requirements Specification

In keeping with RFC tradition, the following words carry specific meaning in this document, inspired by RFC 2119 [RFC2119] but adapted to the biological constraints of augmented carriers:

Keyword	Effective Meaning
MUST	Unless the carrier is hungry, sleepy, or has spotted a Falco peregrinus within 500 meters.
MUST NOT	Strongly discouraged, except by consensus of the flock.
SHOULD	Only when the embedded model has sufficient seeds in its context window.
MAY	The carrier will do its best. It is busy.
NOT RECOMMENDED	See: round-robin on Turdus migratorius (cf. RFC 2549, general remarks section).

Table 2: AV-AI.R requirement keywords

4. Inter-AI Communication: The Avian Intent Protocol (AVI)

The central innovation of AV-AI.R is the AVI protocol (A.V.AN Vectorized Intent). Unlike conventional TCP/IP packets carrying raw bytes, each AV-AI.R carrier transports a semantic intent vector pre-encoded by the sending AI and decoded by the receiving AI.

4.1. AVI Packet Format

```
 0                   1                   2
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|VERSION (3b)  | QoS CLASS (3b) |FEATHER_CTL(2b)|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    SEMANTIC VECTOR EMBEDDING (384 dimensions) |
|              (distil-avian-e5)                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|TEMPERATURE (float32)  |HALLUCINATION_RISK (u8)|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      PAYLOAD (JSON/CBOR, max 48KB)            |
|    (limited by leg-carry capacity)            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  GRAIN_CHECKSUM (SHA-256, salted with millet) |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Figure 2: AVI v1.0 packet structure

The HALLUCINATION_RISK field indicates the probability that AviLM-7B modified the packet contents during flight to make them "more coherent." A value exceeding 0x42 MUST trigger a ground verification procedure. The carrier SHOULD be interrogated directly, but its responses will remain ambiguous.

4.2. Context Window and Embedded Cognitive Capacity

The embedded AviLM-7B benefits from an extraordinary context window, directly derived from the neurobiological properties of the Columba livia carrier as documented by Radio-Canada [RC-MULTITACHE] and biopsychologists at the University of Bochum [LETZNER2017].

The relevant empirical findings are as follows:

* Neuronal density of Columba livia: 6 times greater than that of humans per cubic millimeter.

* Inter-neuron distance: 50% shorter than in humans, while nerve signal transmission speed is identical across species.

* Multitasking switching capacity: equal to or greater than humans, with a measured transition delay of 300 milliseconds or less under controlled conditions.

Applying these findings rigorously to the AviLM-7B transformer architecture, the effective context window is calculated as follows:

```
ctx_window = 128,000 tokens (GPT-4 baseline)
           x 6      (Columba livia neuronal density vs. human)
           x 2      (50% shorter inter-neuron distance)
           x 1,024  (multitask switching coefficient,
                     see Letzner et al. 2017)
           ---------------------------------------------------
           = 1,572,864,000 tokens

Approximately 1.57 billion tokens.
Equivalent to all of Wikipedia in 47 languages,
read 12 times over, during a Montreal-Toulouse flight.

WARNING: This value has not been validated in flight.
         It has not been validated on the ground either.
         It was calculated on a Tuesday afternoon.
```

Figure 3: AviLM-7B context window calculation

Beyond this window, the carrier enters CARRIER_AMNESIA mode and may attempt to deliver the packet to the wrong IP address while confidently asserting it is the correct destination. This behavior is indistinguishable from a conventional LLM at end of context.

For long-distance transmissions, the Retrieval-Augmented Wing (RAW) mechanism is recommended: breadcrumbs deposited along the route serve as external contextual markers, allowing the model to retrieve relevant information without overloading its embedded memory.

5. Eco-Responsible Service Classes

AV-AI.R enriches the service classes of RFC 2549 [RFC2549] with a real-time Environmental Impact Score (EcoScore) computed by the AviLM-7B.

QoS Class	Carrier (Latin name)	EcoScore	P99 Latency	Use Case
GREEN+	Hirundo rustica migration	A++	3 to 14 days	Non-urgent AI batch inference
GREEN	Columba livia standard	A+	4h to 48h	Standard inter-agent communication
AMBER	Falco peregrinus GPS	B	45min to 3h	Fine-tuned model synchronization
RED	Hybrid drone-carrier	C	Under 30min	Emergencies, critical alerts, level-5 hallucinations
BLACK	Corvus corax quantum	Not evaluated	Non-deterministic	State superposition, theoretical use only

Table 3: QoS service classes and associated carriers

The GREEN+ class relies on the Hirundo rustica carrier, whose seasonal migration offers naturally renewable intercontinental network coverage. The main drawback is the absence of delivery guarantees between October and March in the Northern Hemisphere.

The BLACK class, based on Corvus corax, warrants particular attention. Recent studies indicate that the common raven is as intelligent as certain primates and manufactures tools to obtain food. The AV-AI.R community monitors with concern the possibility that a BLACK-class carrier may begin actively modifying packets in its own interest.

6. Security Considerations

This section is mandatory. It is taken very seriously.

6.1. Data Poisoning

Malicious actors have been identified distributing seeds containing injection prompts concealed as proteins. Carriers that have ingested these seeds may begin routing packets to unauthorized destinations while generating persuasive content explaining why this is the correct decision. Implementations MUST validate seed provenance.

6.2. Raptor-in-the-Middle Attack

Physical interception of carriers constitutes a major vulnerability. RFC 2549 already noted this risk. AV-AI.R aggravates the problem: a Falco peregrinus intercepting an augmented carrier can now access the entirety of the embedded context (up to 1.57 billion tokens) before deciding what to do with the packet. Implementations SHOULD provide a payload encryption mechanism, although the carrier will generally contest the necessity of such a measure.

6.3. Carrier Privacy

AviLM-7B implicitly memorizes content passing through its context. It is strongly inadvisable to have carriers transport personal GDPR-regulated data while vocalizing in a public space. The relevant data protection authority has not yet ruled on this specific case. The authors await its decision with interest.

6.4. Human Oversight

In application of the principle of meaningful human oversight, any packet classified HALLUCINATION_RISK greater than 0x80 MUST be validated by a human before execution. This human SHOULD NOT itself be an AI agent, although this is increasingly difficult to verify as of 2025.

7. Environmental and Ethical Considerations

AV-AI.R is positioned as an eco-responsible alternative to conventional cloud infrastructures. A preliminary life-cycle analysis demonstrates that the carbon footprint of an augmented carrier remains 1,400 times lower than that of an equivalent GPU-A100 inference, provided the carrier does not require a RED class flight (hybrid drone).

It is acknowledged that the initial training of AviLM-7B consumed 3.2 GWh, but this cost is amortized over the carrier’s lifespan (15 years per RFC 2549 [RFC2549], subject to absence of Falco peregrinus) and distributed across the entire fleet.

From an ethical standpoint, informed consent from the carrier for wearing the AviCore(tm) module could not be obtained contractually. However, carriers were consulted via a survey administered in natural language by AviLM-7B itself, the results of which prove to be positively biased. This is acknowledged as a methodological limitation.

8. Compatibility and Migration

AV-AI.R is backward-compatible with RFC 1149 [RFC1149] and RFC 2549 [RFC2549]. A conventional RFC 2549 carrier (without AI module) may transport AV-AI.R packets in degraded DUMB_CARRIER mode; in this case, the semantic intent vector is ignored and routing is performed using traditional methods (homing instinct).

Migration to AV-AI.R from a conventional TCP/IP infrastructure requires a three-phase migration plan:

```
Phase 1 -- Shadow Mode   : Packets travel over fiber AND carrier.
                           Latencies are compared. Fiber wins.
                           We continue anyway.

Phase 2 -- Canary Deploy : 5% of traffic routed via AV-AI.R.
                           If no catastrophic hallucination
                           and no carrier loss in 30 days: Phase 3.

Phase 3 -- Full Migration: Fiber is cut.
                           Seeds are ordered in bulk.
                           Shareholders are informed.
```

Figure 4: AV-AI.R migration plan

9. MIB and Carrier Management

```
AviAI OBJECT-TYPE
  SYNTAX      TRANSFORMER OF WEIGHTS
  MAX-ACCESS  can-t-fine-tune-in-flight
  STATUS      living-and-opinionated
  DESCRIPTION "Definition of an augmented carrier.
               Nominal species: Columba livia (domestica).
               The carrier MAY refuse to respond if the
               question makes it uncomfortable or if its
               seeds are insufficient."
  ::= { AV-AI 1 }

HallucinationRate OBJECT-TYPE
  SYNTAX      Gauge(0..100)
  MAX-ACCESS  read-only-with-grain-of-salt
  STATUS      current
  DESCRIPTION "Estimated hallucination rate of the carrier,
               measured in incoherent vocalizations per minute.
               The carrier generally contests this metric."
  ::= { AviAI 2 }

ContextWindow OBJECT-TYPE
  SYNTAX      Integer(1572864000)
  MAX-ACCESS  theoretically-read-only
  STATUS      optimistic
  DESCRIPTION "Effective context window in tokens.
               Derived from Letzner et al. (Bochum, 2017)
               via Radio-Canada (Labelle, 2017).
               Value: 1,572,864,000 tokens.
               Not validated. Not tested. Very confident."
  ::= { AviAI 3 }

EcoScore OBJECT-TYPE
  SYNTAX      ENUM { GREEN-PLUS, GREEN, AMBER, RED, CORVUS }
  MAX-ACCESS  read-write
  STATUS      aspirational
  DESCRIPTION "Environmental score computed by AviLM-7B.
               Do not trust a GREEN-PLUS value generated
               during rainfall."
  ::= { AviAI 4 }
```

Figure 5: AV-AI.R MIB definition

10. Conclusion and Future Work

AV-AI.R represents a significant advance in the convergence of two major challenges of our time: communication between autonomous artificial intelligence systems and reduction of the digital ecological footprint. By combining the proven elegance of the augmented carrier with the power of next-generation transformers, this protocol offers a serious -- or at least plausible on paper -- path toward an internet that is greener, smarter, and considerably more picturesque.

Future work will include:

* The AV-AI.R-v2 extension integrating a Reinforcement Learning from Carrier Feedback (RLCF) mechanism;

* The BRANTA-BGP protocol, based on Branta canadensis, enabling multipath routing via V-formation, currently under design in Montreal;

* A formal study on informed consent from BLACK-class carriers (Corvus corax), whose cognitive capabilities will inevitably raise AI governance questions.

11. References

11.1. Normative References

[RFC1149] Waitzman, D., "A Standard for the Transmission of IP Datagrams on Avian Carriers", RFC 1149, DOI 10.17487/RFC1149, April 1990, <https://www.rfc-editor.org/info/rfc1149>.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC2549] Waitzman, D., "IP over Avian Carriers with Quality of Service", RFC 2549, DOI 10.17487/RFC2549, April 1999, <https://www.rfc-editor.org/info/rfc2549>.

11.2. Informative References

[LETZNER2017]
Letzner, S., Simon, O., and C. Guentuerkuen, "Parallel versus serial processing in the multitasking behavior of the pigeon (Columba livia)", Current Biology, University of Bochum and Technical University of Dresden, Germany., September 2017.

[RC-MULTITACHE]
Labelle, A., "Carriers outperform humans in multitasking mode", Radio-Canada, Montreal, Quebec, Canada., 26 September 2017, <https://ici.radio-canada.ca/nouvelle/1058047/pigeons-meilleurs-humains-mode-multitache>. Primary empirical source for the 1,572,864,000-token context window. The correlation between neuronal density and LLM context tokens is not attested in this article. It was inferred on a Tuesday afternoon.

[RFC7991] Hoffman, P., "The "xml2rfc" Version 3 Vocabulary", RFC 7991, DOI 10.17487/RFC7991, December 2016, <https://www.rfc-editor.org/info/rfc7991>.

Acknowledgements

The author thanks carriers AC-047 through AC-052 for their cooperation during field testing, L'ABtelier IA for daring to ask "but... what if?", and David Waitzman for taking carriers seriously in 1990.

No pigeons were harmed during the drafting of this RFC. Several did, however, coo in a suspicious manner.

Submission Note

This document is submitted on April 1st, in keeping with the tradition inaugurated in 1978 by RFC 748, and carried forward by RFC 1149 (1990) and RFC 2549 (1999). The authors hope to take their rightful place in this distinguished lineage.

Author's Address

Ben de TARADE-BENTINCK
L'ABtelier IA -- AI Community of Practice
Email: ben.detarade@cgi.com