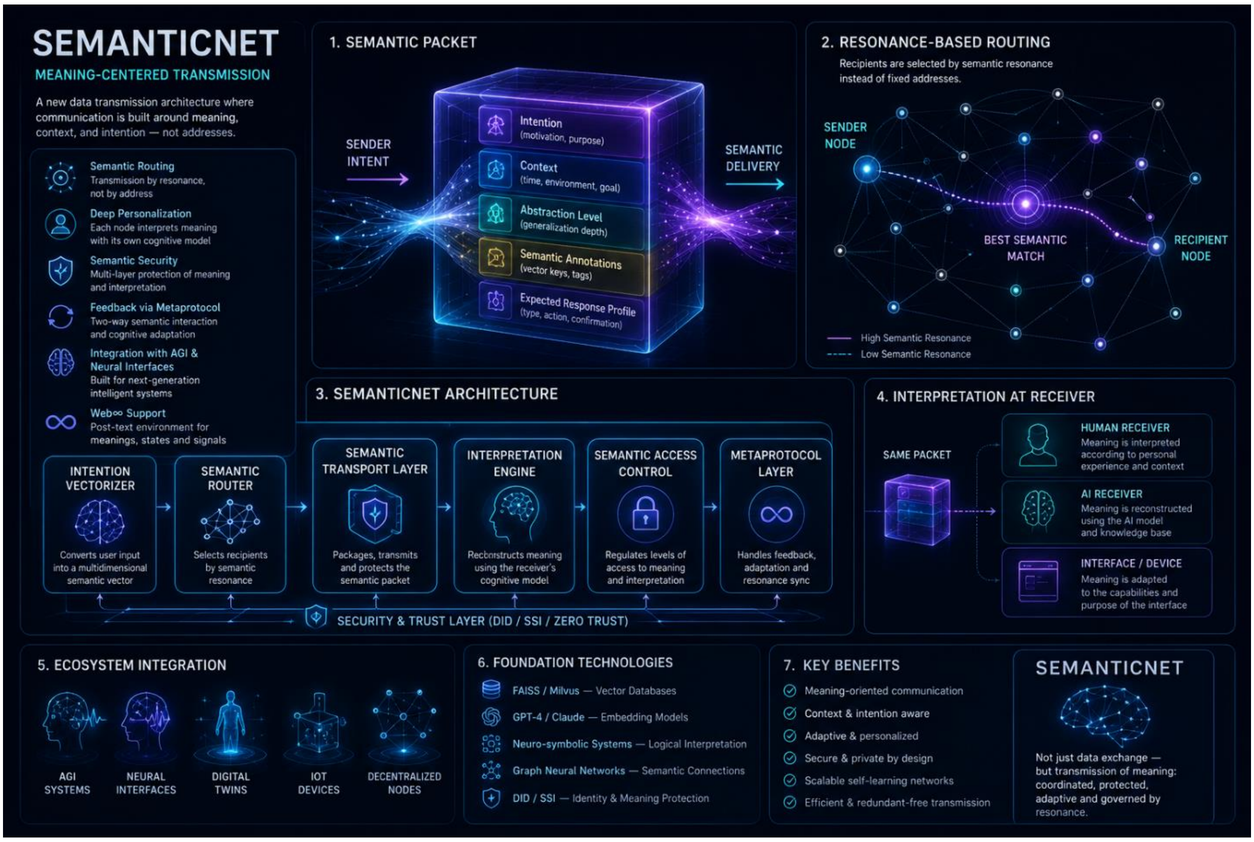
SemanticNet



A new data transmission architecture in which the central element of communication becomes structured meaning rather than linear text or binary data. Instead of conventional IP packet transmission protocols or HTTP request-response models, the system implements meaning-centered routing based on a vectorized intention model and resonance-based recipient selection.

In the traditional Internet, the network does not understand the content of interaction — it merely transfers data between addresses. SemanticNet introduces a new layer of network architecture in which communication is built around meanings, context, and intentions.

The transmitted semantic packet includes the following key components:

- Intention (the sender’s motivation and communicative intent);
- Contextual parameters (time, environment, interaction goal);
- Level of abstraction (degree of generalization);
- Semantic annotations (vector keys and semantic tags);
- Expected response profile (preferred response type, action, or confirmation).

On the receiving side, meaning is not interpreted universally, but is individually reconstructed according to the cognitive model of the node, providing maximum flexibility and adaptation for users, AI systems, or interfaces.

Advantages over traditional technologies:

- Semantic routing: data transmission is performed not by address, but through semantic resonance between the intention vector and the receiver structure.

- Deep personalization: each network node interprets meaning according to its unique cognitive model.
- Semantic security: protection against interception and incorrect interpretation is achieved through semantic isolation and multi-layer packet structure.
- Feedback via metaprotocol: enables transmission not only of responses, but also of changes in the cognitive structure of the node caused by the message.
- Integration with AGI and neural interfaces: vector-based formatting and contextual addressing make the protocol suitable for next-generation AI systems.
- Web∞ support: the architecture is designed for a post-text environment where interaction occurs at the level of meanings, states, and cognitive signals.

Distinction from existing technologies:

- Contrasts with TCP/IP, HTTP, and REST, where transmission occurs in the form of linear data and requires explicit request-response structures.
- Differs from Semantic Web and RDF systems, which represent knowledge as triples but do not provide mechanisms for semantic routing or intention transmission.
- Extends beyond vector databases and LLM interfaces by enabling not only information access, but also active intention transmission in an addressable semantic form.
- Introduces the concept of resonance-based addressing, where recipients are determined by semantic correspondence rather than fixed addresses or IDs.
- Functions as a universal semantic protocol capable of operating within decentralized cognitive networks and supporting hybrid interaction between AI, humans, and machines.

Architecture and Component Interaction

Core system modules:

- Intention Vectorizer — transforms user input into a multidimensional semantic vector.
- Semantic Router — selects recipients based on semantic resonance.
- Semantic Transport Module — handles packaging, transmission, and protection of semantic packets.
- Interpretation Module — reconstructs meaning on the receiver side according to the local cognitive model.
- Semantic Access Mechanism — regulates levels of semantic perception and interpretation access.
- Metaprotocol Layer — provides adaptive feedback and resonance-based synchronization.

Architectural features:

- Data transmission is performed through a meaning-oriented protocol.
- Semantic addressing is used instead of IP-based addressing.
- Flexible interpretation is possible under partial semantic correspondence.
- Security is implemented at the semantic and interpretational access levels.

Possible implementation models:

- Software-hardware integration in next-generation equipment.
- Libraries and APIs for LLMs, digital twins, and neural interfaces.
- SemanticNet protocols as an alternative semantic layer to TCP/IP.
- Specialized IoT devices.

- Integration into AGI and cognitive architectures.

Technical results:

1. Implementation of context-aware and intention-aware semantic transmission.
2. Adaptation for AGI, neural interfaces, and Web∞ environments.
3. Security through semantic filtering and interpretational isolation.
4. Scalability of self-learning distributed networks.
5. Integration across all layers of the technology stack.
6. Reduced redundancy and increased transmission efficiency.

Difference from conventional systems

Existing network protocols such as TCP/IP, HTTP, and REST are designed for the transmission of structured data, but do not contain built-in mechanisms for semantic interpretation or semantic routing. SemanticNet introduces a fundamentally new approach providing high semantic density, adaptive interaction, and integration with neural and cyber-physical environments.

SemanticNet enables not merely data exchange, but the transmission of meaning — coordinated, protected, adaptive, and governed through resonance-based criteria.

Despite the profound novelty and transformational nature of the proposed meaning-centered routing architecture SemanticNet, its formation does not emerge in a conceptual vacuum. On the contrary, the system evolves from mature and validated technological domains spanning neurosemantic processing, distributed vector databases, graph neural networks, cryptographic identity systems, and semantic routing protocols.

SemanticNet represents a synthesis and next evolutionary stage of the following directions:

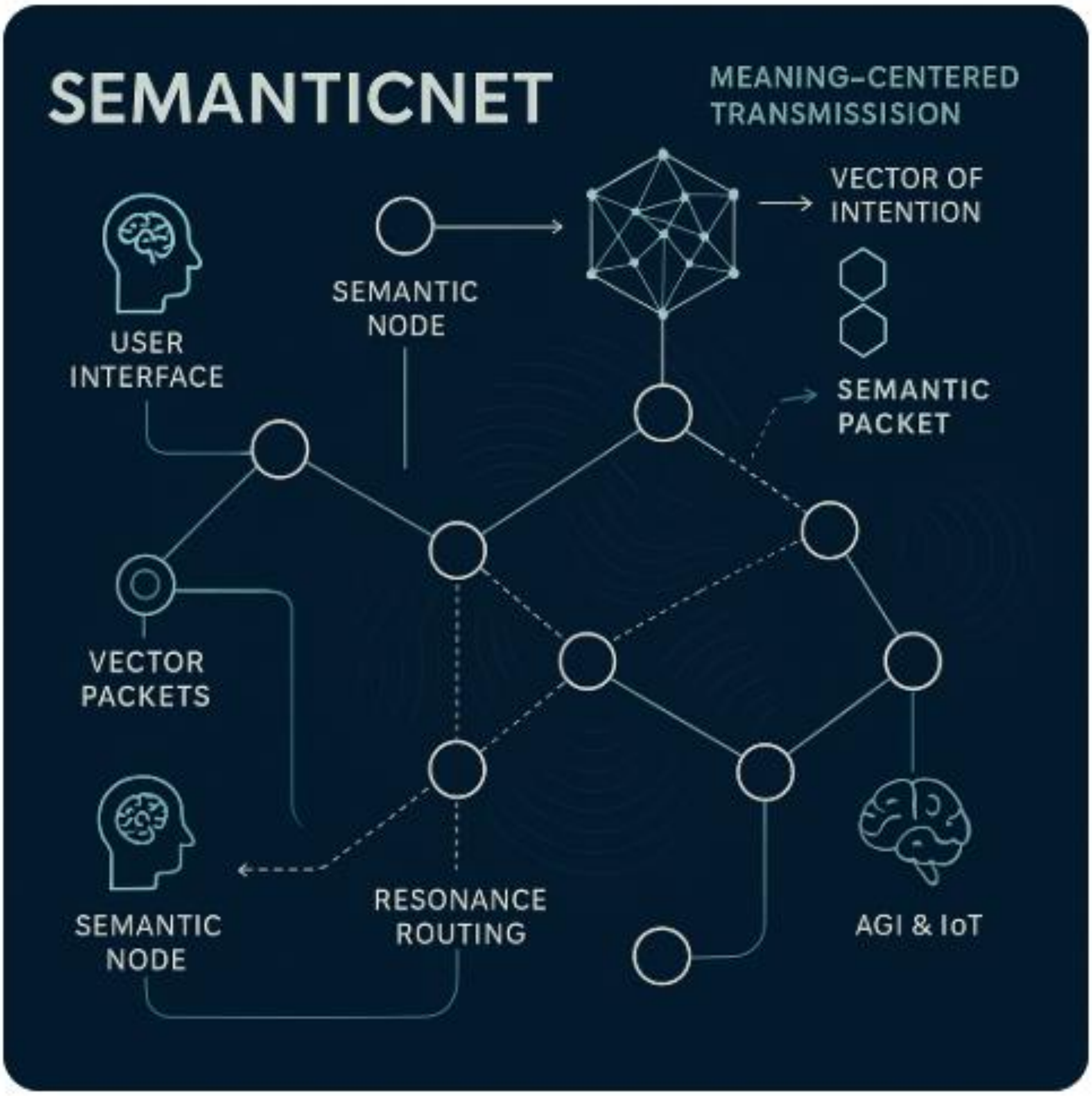
- neural-network embedding spaces,
- cognitive agent-based intention processing models,
- trustless infrastructure frameworks (Zero Trust & DID),
- interpretational analysis within the neurosemiotic paradigm,
- experimental approaches to semantic routing.

Thus, SemanticNet functions as a supra-system integration in which existing technological achievements are transformed into a next-generation architecture — an infrastructure for semantic transmission and resonance-based connectivity between nodes, agents, and cognitive interfaces.

Proof of Feasibility (Foundation on Existing Technologies)

- FAISS, Milvus — vector database technologies for high-dimensional semantic indexing and retrieval.
- GPT-4, Claude — large language models capable of transforming text into semantic embeddings and contextual vector representations.
- Neuro-symbolic systems — frameworks enabling logical interpretation and semantic reasoning.
- Graph Neural Networks (GNNs) — architectures for constructing and analyzing semantic relationship structures.

- DID/SSI (Decentralized Identity / Self-Sovereign Identity) — technologies for subject identification, trust management, and semantic access protection.



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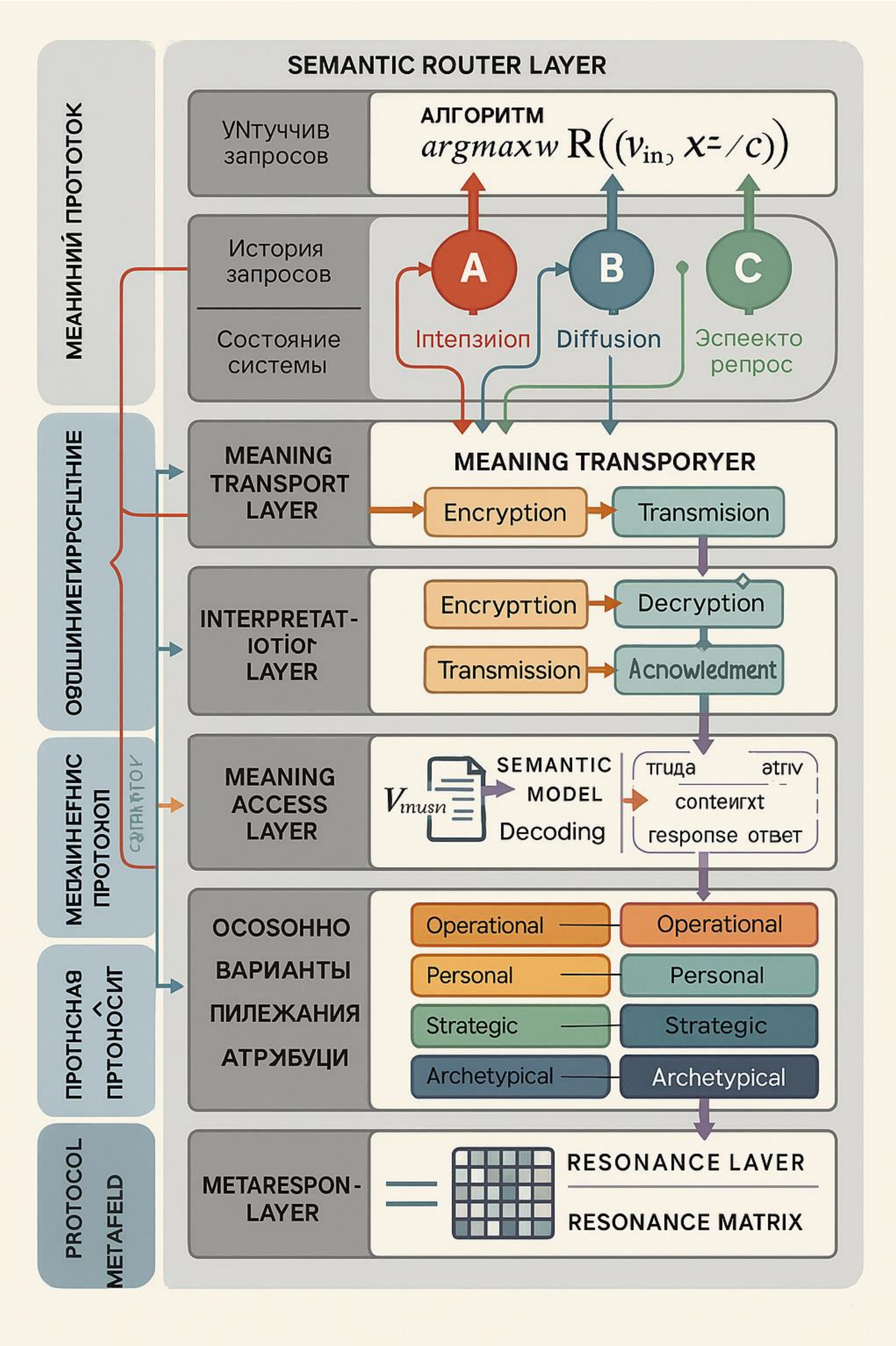
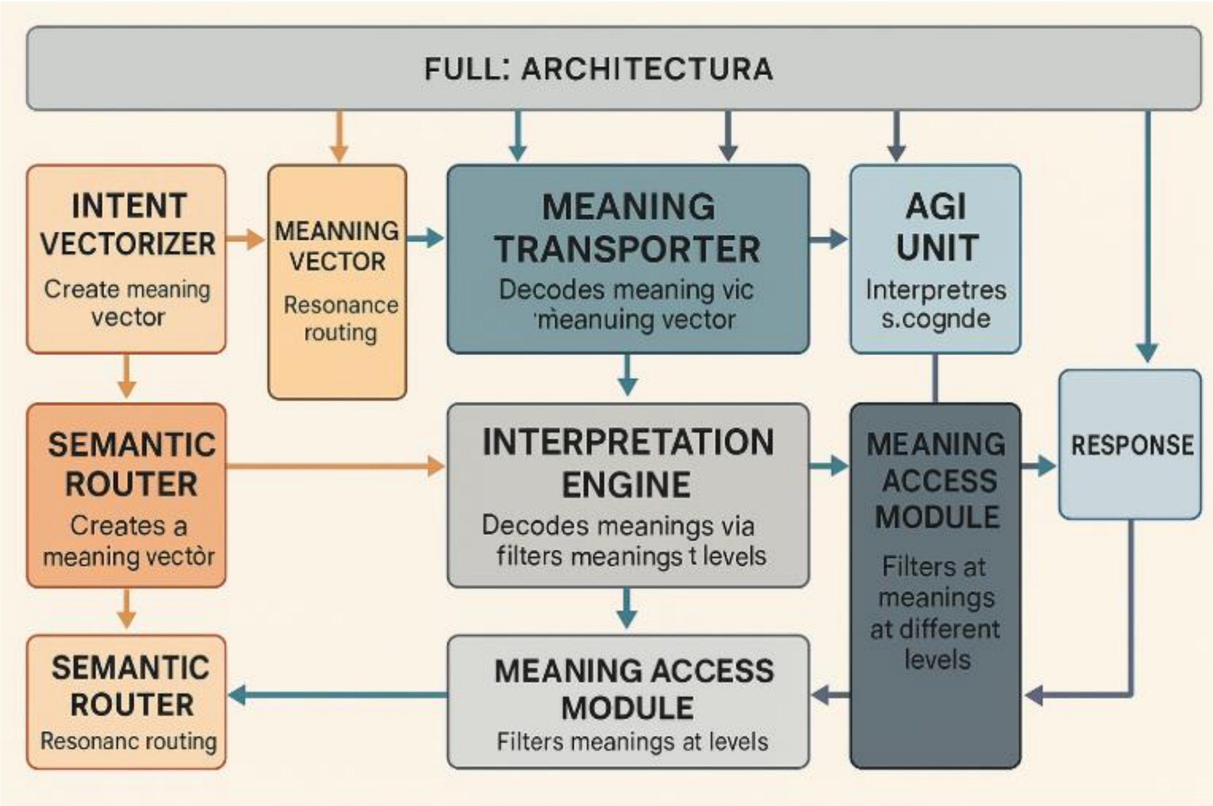


SEMANTIC ROUTER LAYER
МЕАНИНИЙ ПРОТОТОК
УNтуччив запросов
АЛГОРИТМ
argmaxw R((vin, x=/c))
История запросов
Состояние системы
A
B
C
Intenзиоп
Diffusion
Эспеекто репрос
MEANING TRANSPORT LAYER
MEANING TRANSPORYER
Encryption
Transmision
INTERPRETAT- IOTIOГ LAYER
Encryption
Decryption
Transmission
Acnowledment
MEANING ACCESS LAYER
SEMANTIC MODEL
Decoding
Vmusn
труда
atriv
conteиrxt
response ответ
OCOSOHHO ВАРИАНТЫ ПИЛЕЖАНИЯ АТРУБУЦИ
Operational
Operational
Personal
Personal
Strategic
Strategic
Archetypical
Archetypical
METARESPON- LAYER
RESONANCE LAVER
RESONANCE MATRIX
PROTOCOL METAFELD

SemanticNet System Architecture — structural interaction model of the vectorization, semantic routing, transport, and interpretation layers.



Resonance-Based Routing Principle — semantic delivery determined by contextual and intentional matching rather than fixed network addresses.