Broadband Network Gateways with AI

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Broadband Network Gateways with AI

Background

- With the development of AI technology, the concept of Intelligent Broadband Network Gateway (iBNG) was proposed.
- Regarded as a next-generation broadband network gateway that integrates artificial intelligence (AI) technology.
- Provide users with a better network experience.

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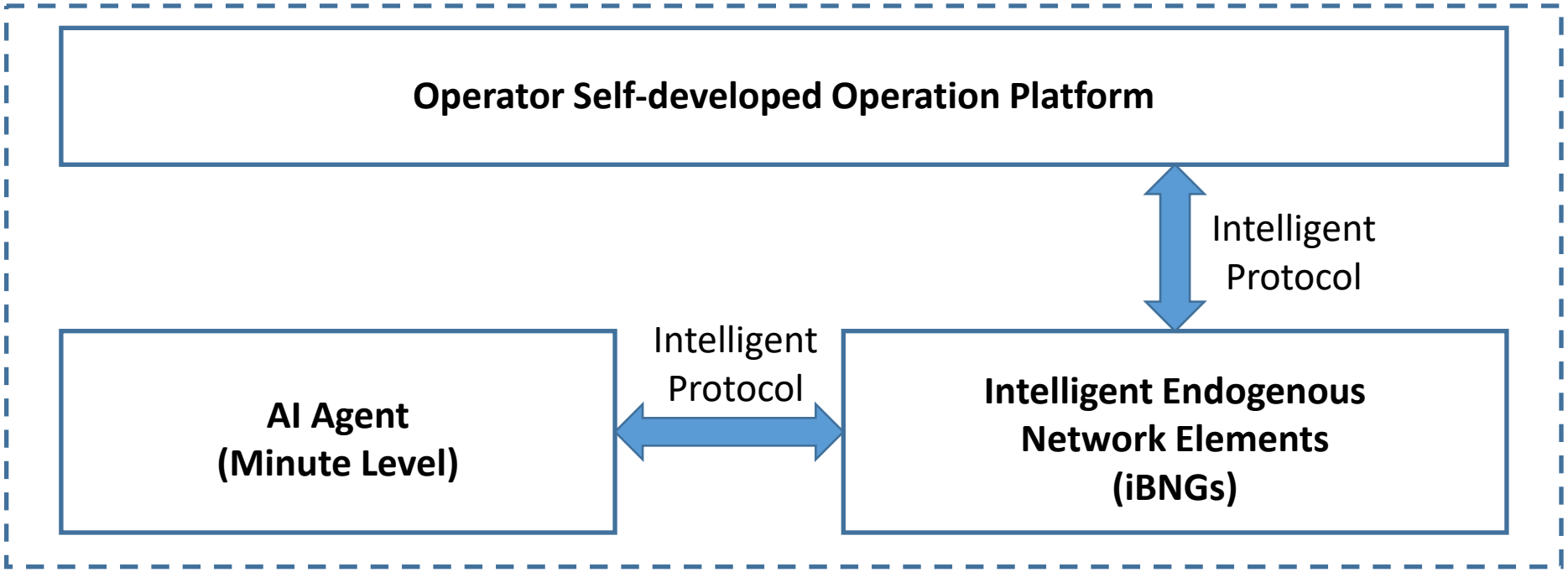
Comparison with Traditional BNG

Advantages of the iBNG:

- More efficient and flexible network management and service optimization.
- Higher network performance.
- Lower operating costs.
- Higher security.
- Greater scalability.

Designed Intelligent Architecture



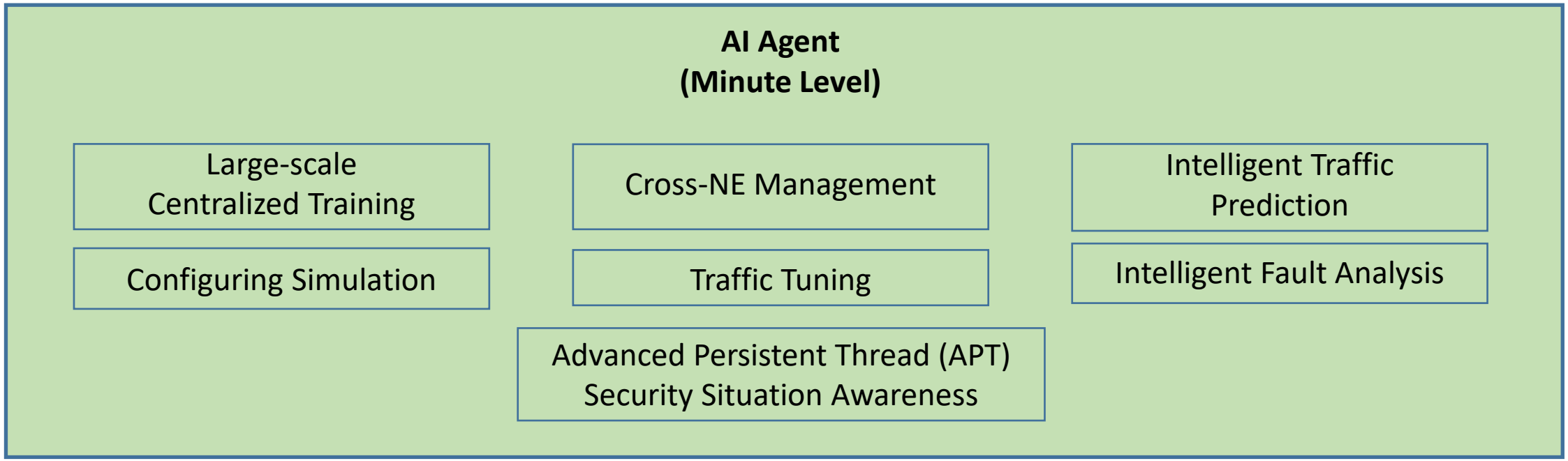
① **Through Intelligent Protocols, cross-domain AI data interaction is achieved between iBNG and Operator Platform.**

② **Through Intelligent Protocols, iBNG and AI Agent can interact with AI data within a single network domain.**

Designed Intelligent Architecture

-- AI Agent

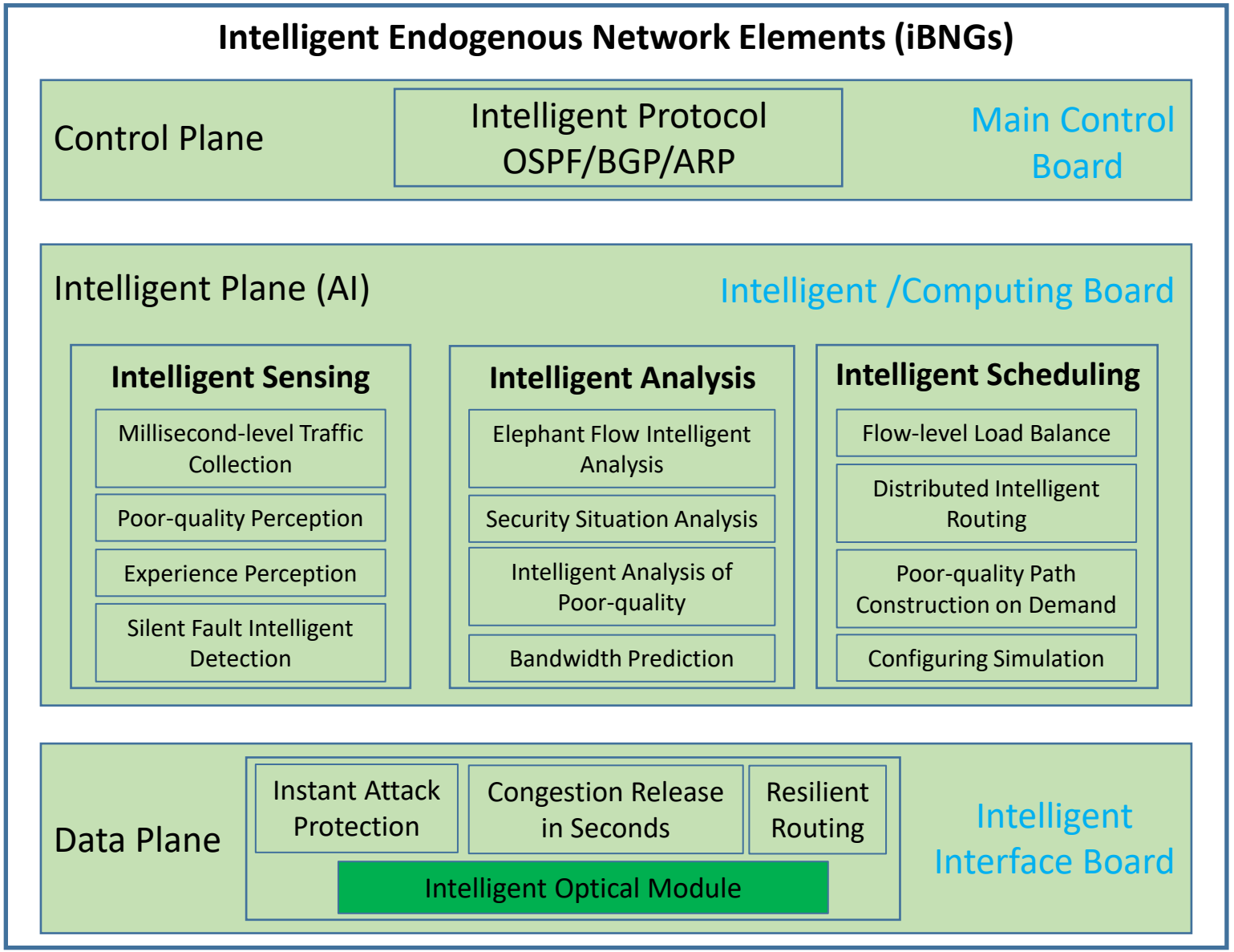
- There is only one in a single network domain;
- Interact with all smart elements in the domain;
- Possessing multiple capabilities.



Designed Intelligent Architecture

-- iBNG

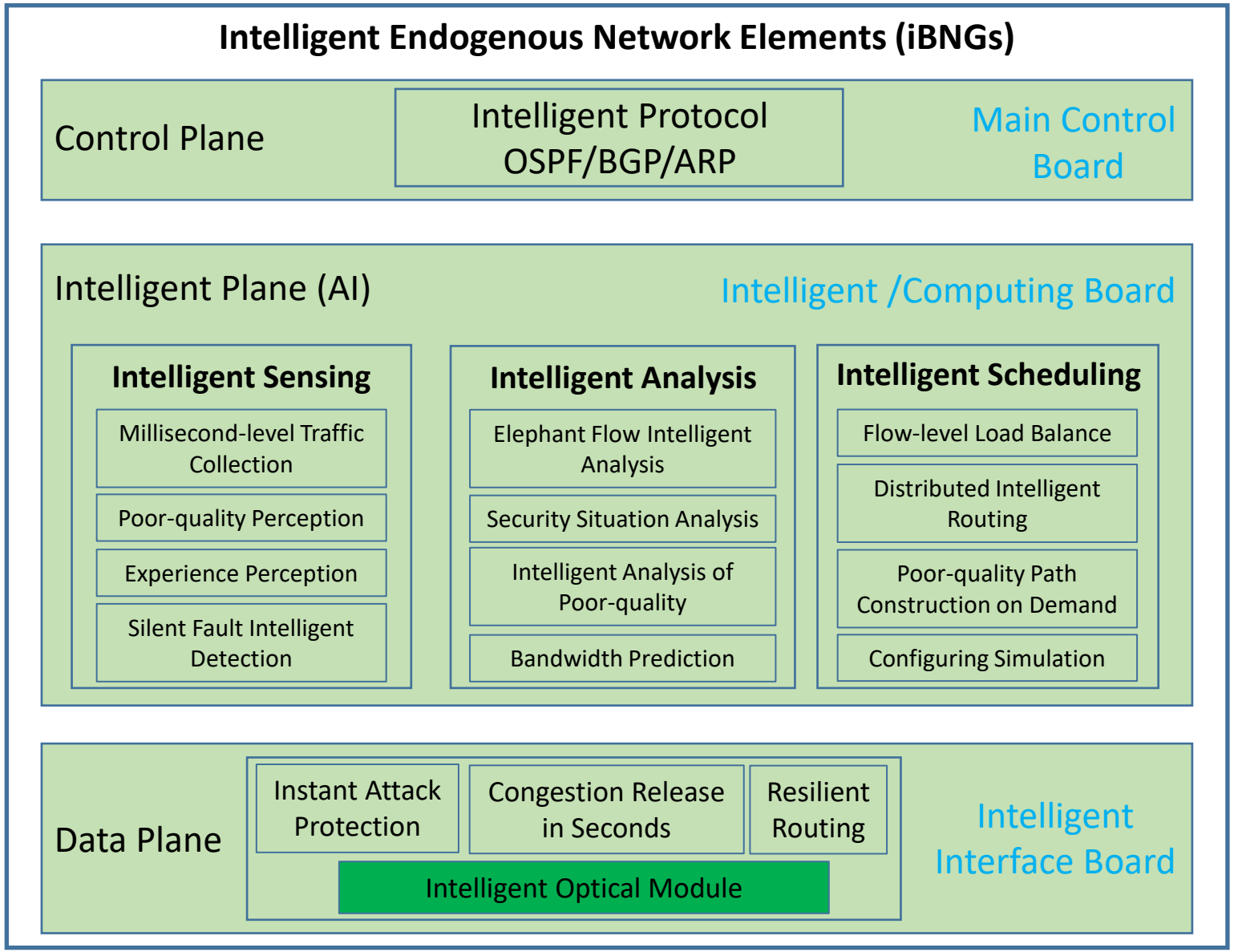
- Consists of three parts: Control plane, Intelligent Plane and Data Plane.
- The control plane includes some Intelligent Protocols, such as BGP, OSPF and ARP, and is located on the Main Control Board.



Designed Intelligent Architecture

-- **iBNG**

- The Intelligent plane has AI Computing ability and has three functions, namely intelligent Sensing, intelligent analysis and intelligent scheduling, located on the intelligent or computing board.
- The data plane has an intelligent optical module, which is located on the intelligent interface board.



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-- iBNG

However, equipment manufacturers still face many challenges in implementing iBNG.

Challenges in the following 5 aspects :

- Technical complexity
- Hardware resource limitations
- Data privacy and security
- Cost and Scalability
- Standardization and industry regulations

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-- iBNG

Key Challenge 1 – Technical Complexity

- AI algorithms need to be designed and optimized to be applicable to network traffic management, user behavior analysis, and security protection.
- Massive data packets need to be processed in real time, and data processing and decision-making must be completed within milliseconds.

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-- iBNG

Key Challenge 2 – Hardware resource limitations

- AI models (especially deep learning models) usually require high-performance hardware support, such as GPUs and TPUs.
- High-performance hardware may increase the energy consumption and cost of the device, and a balance needs to be found between performance and cost.

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-- iBNG

Key Challenge 3 – Data Privacy and Security

- The training and optimization of AI models requires a large amount of network data, and a compliant data collection and processing mechanism needs to be designed to protect user privacy.
- The AI model itself will also become an attack target, and the security and robustness of the model need to be strengthened.

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Key Challenge 4 – Cost and Scalability

- The design of AI-based broadband network gateways will increase hardware and development costs, while also needing to support large-scale deployment.
- Under the premise of controlling costs, a scalable solution is needed to meet the needs of networks of different sizes.

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-- iBNG

Key Challenge 5 – Standardization and Industry Regulations

- AI-based broadband network gateways lack unified standards and specifications, resulting in the inability of solutions from different manufacturers to communicate with each other.
- Also need to actively participate in standard setting to promote the standardization and popularization of technology.

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Summary:

- ✓ Although the implementation of iBNG faces many challenges, once it is successfully implemented.
- ✓ With the continuous advancement of AI technology and network infrastructure, iBNG will play an increasingly important role in future networks.

Thank You !