

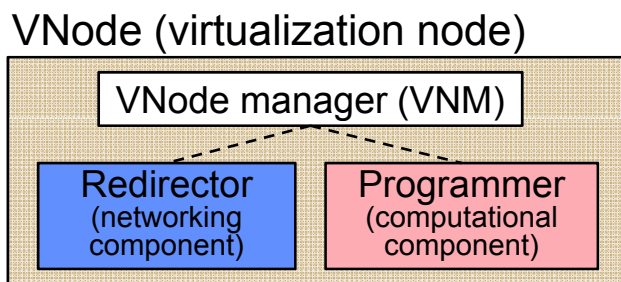
A VNode Plug-in Architecture to Evolve VNode

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Summary: VNode enabled mutually independent evolution of programmers and redirectors. In this presentation, a method for evolving VNodes and developing new species of virtual links by using both control and data plug-ins and a publicly available testbed is proposed.

1. Introduction

Background: VNode enabled mutually independent evolution of programmers and redirectors [2], which are components of VNode.



Problem to solve: A method for evolving VNode, especially for developing advanced redirectors and new types of link slivers (i.e., virtual links), should be developed.

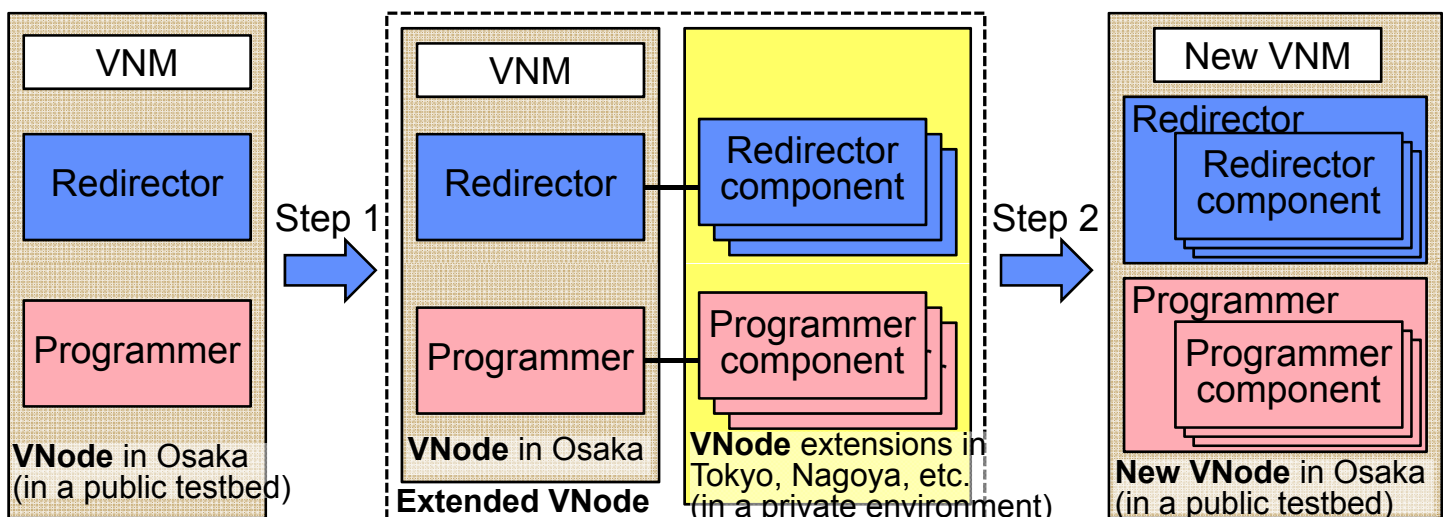
2. Proposed evolution steps

Step 1: To develop new node functions as Redirector/Programmer prototype components in a publicly available testbed (such as JGN-X).

- There is no need to extend VNM and the network manager (SNC/TNC).

Step 2: To implement management of new successful functions in VNM, the network manager, and Redirector/Programmer in the testbed.

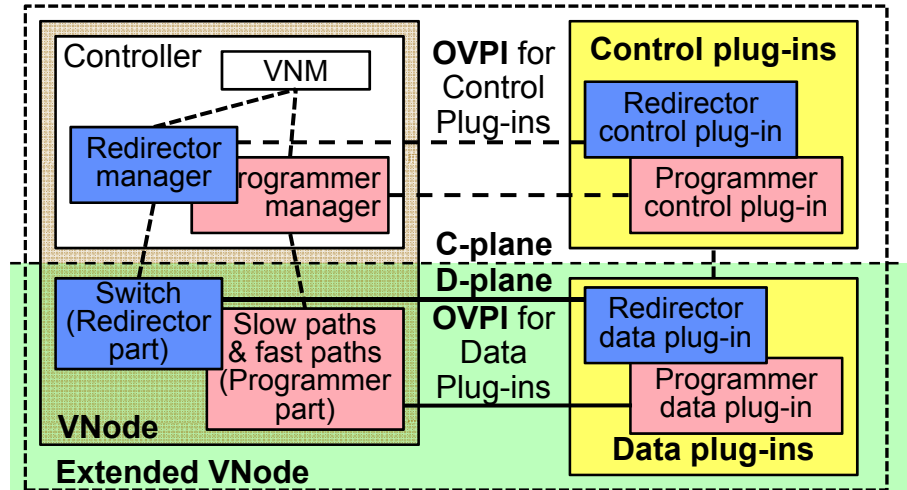
- The network manager manages the resources of the new node function, and can select the best node function.



3. A plug-in architecture for step 1

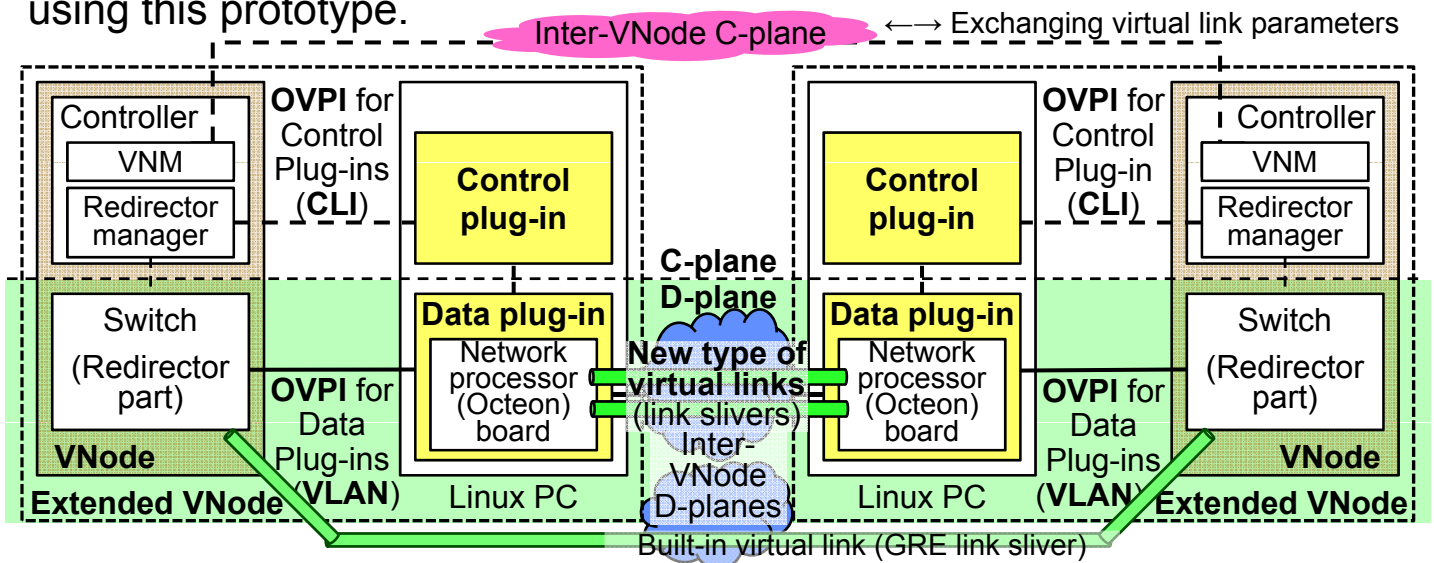
The following architecture and method is used.

- An open VNode plug-in interface (OVPI) is used for this extension.
- OVPI has both C-plane and D-plane interfaces.
- Plug-ins may be placed at a distant place from the VNode.



4. Prototyping and evaluation

- A preliminary version of OVPI was implemented in the Redirector.
- An open and high-level language “CSP” and its development environment “+Net” for Cavium Octeon® network processor [1] was used for evaluation.
- VLAN-based virtual links (link slivers) were implemented and tested by using this prototype.



5. Concluding remarks

- A method of evolving VNode is proposed and the step 1 of this method is partially tested by extending the Redirector.
- A future work is to apply this method to the VNodes in JGN-X.

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References

- [1] Kanada, Y., “ネットワーク・プロセッサのためのオープンで高級で移植可能なプログラミング環境”, 電子情報通信学会 第 7 回 ネットワーク仮想化時限研究会, July 2013 (not yet available in English).
- [2] Kanada, Y., Shiraishi, K., and Nakao, A., “Network-virtualization Nodes that Support Mutually Independent Development and Evolution of Node Components”, 13th IEEE International Conference on Communication Systems (ICCS 2012), November 2012.