

CRONOS-2024 AREA 1 (PO:NAKAO)

An Internet-scale Turing Machine and its Applications

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Grand Challenge and Goal:

Developing an evolvable Internet architecture and revolutionizing computing by integrating computing and networking into an Internet-scale computing platform

Summary:

An Internet-scale Turing machine: Integrating networking and computing

A computing model that enables stateless communication and computation and universal computing

A switch architecture supporting the computing model

New Internet architectures based on the computing model

Originality of the Internet-scale Turing machine

High failure resilience and scalability thanks to the universality and the statefulness

Accommodating multiple clean-slate Internet architectures

Social Impact:

- It serves as the foundational framework for an evolvable Internet.
- It breaks the monopoly by hypergiants, thereby fostering a more decentralized, distributed and open Internet ecosystem.
- It prevents large-scale and long-term failures.

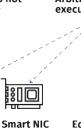
Internet-scale Turing Machine Integrating computing and networking

Stateless networking and computing

 Switches and routers do not maitain states of communication and computation

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Hotswap



Universal computing on the Internet

 Arbitrary computing can be executed on arbitrary nodes





Evolvable Internet

High Failure Resilience and Scalability

Switch

Router

 Stateless and universal networking and computing enable seamless platform extensions, localization of failure effects, and hotswap quick recovery

Accommodating multiple existing and future clean-slate Internet architectures