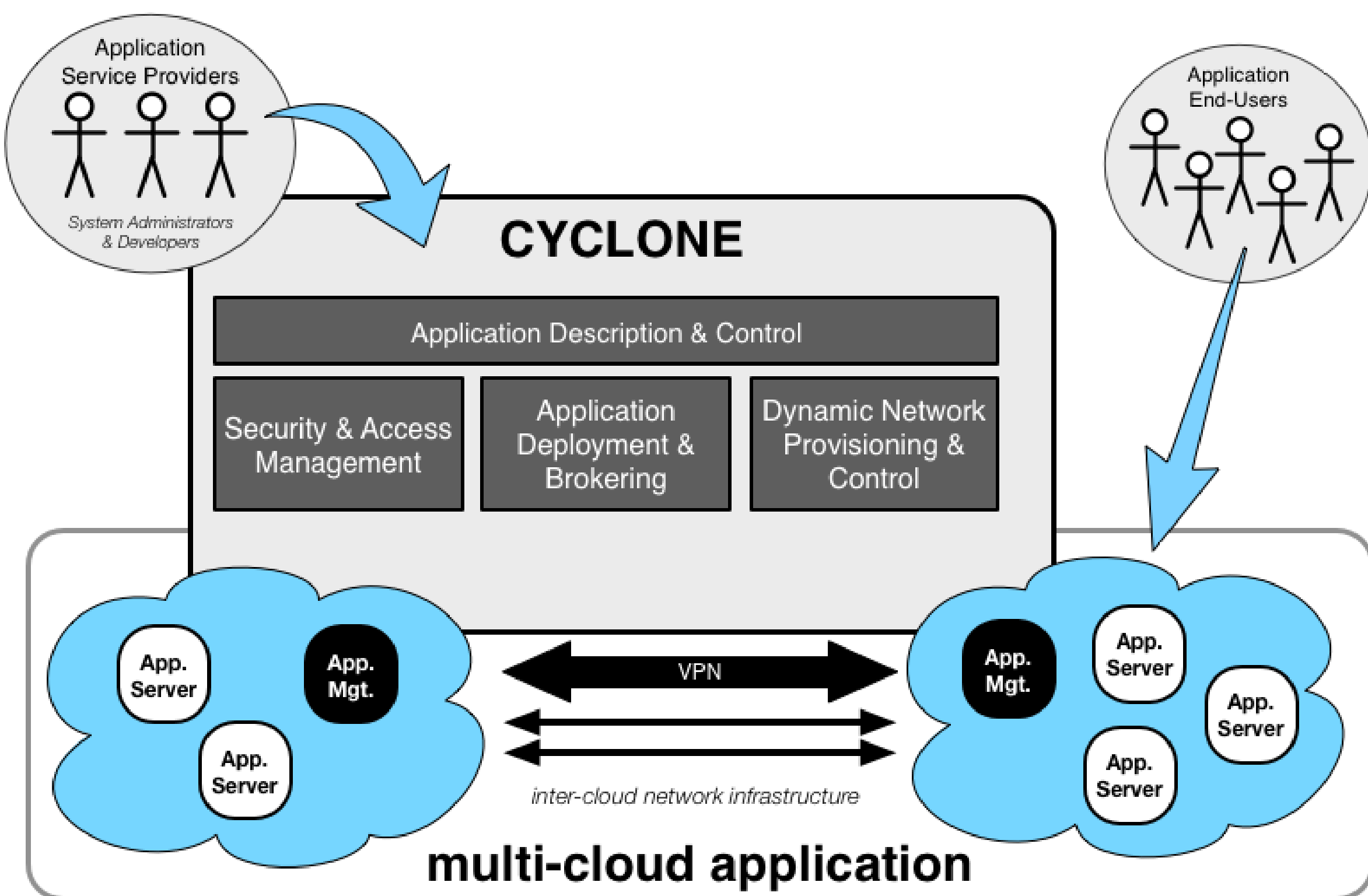


Cyclone

CYCLONE: Multi-cloud applications deployment and management platform for research and academic community

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CYCLONE Ecosystem and Services Provisioning Model



CYCLONE integrates and improves mature, open-source components, such as SlipStream, StratusLab, OpenNaaS and TCTP/TRESOR

CYCLONE Services and Functional Components

Key research and innovation challenges in CYCLONE are briefly summarized in the following major areas.

High Performance Heterogeneous Cloud Infrastructures. CYCLONE software allows users to aggregate cloud resources from both private and public providers to build a cloud platform that is tailored to their application's needs. The abstraction of cloud- and application-level services is key to take advantage of heterogeneous cloud resources with minimal effort.

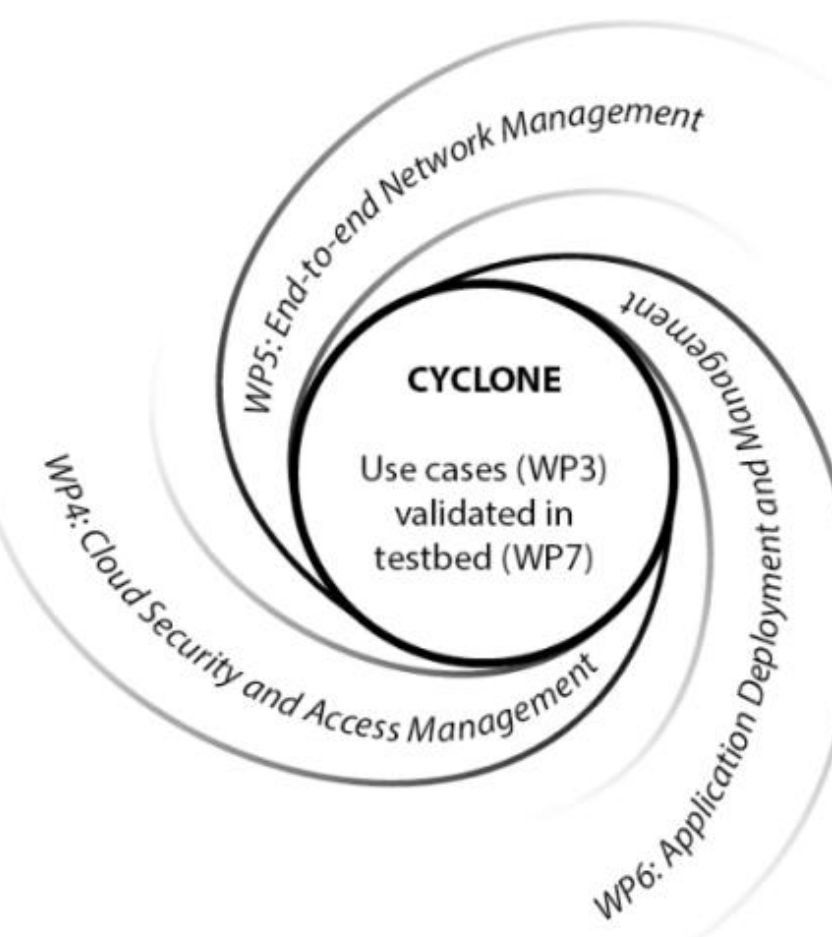
Federated Cloud Networking. CYCLONE incorporates and improves the OpenNaaS software to allow the dynamic allocation of high-bandwidth channels inside and between data centers.

Dynamic Configuration, Provisioning, and Orchestration of Cloud Resources. CYCLONE will extend SlipStream to allow the selection and provisioning of resources based on user-defined algorithms. Moreover, the project will allow pluggable monitoring services to orchestrate the topology of the application dynamically while it is running.

Automated Discovery and Service Composition. CYCLONE will provide a common interface and mechanisms to discover applications and services that have been created and shared by other users of the system by extending similar functionality available in SlipStream and StratusLab

Intercloud Security Infrastructure. TRESOR and GAAA-TK enable end-to-end security what will allow ASPs to minimize the exposure of their applications and enhance their security. CYCLONE security infrastructure will support user community/home federations and identity management services.

CYCLONE Definition, Design and Operational Principles



CYCLONE primary goal is to provide the software for a production-quality platform that facilitates the deployment and management of complex, cloud-based applications.

CYCLONE will integrate partner's established **cloud solutions** for managing software-defined networking, application deployment, cloud security and access management into a holistic cloud action and resource model.

CYCLONE integrated model will create a **holistic cloud management platform**, which empowers platform users to deploy their services on any cloud of their choosing and still be able to manage it uniformly.

Use cases

Two flagship applications areas have been selected to guide the initial development of the CYCLONE tools:

- Academic cloud platform and associated services for bioinformatics research
- Commercial deployment for smart grids in the energy sector

CYCLONE Research and Development Objectives

- Improve cloud services in the IaaS layer by integrating network services into the cloud and offering a direct control over VM's network accessibility, intra-site data access, and inter-site data transfers.
- Develop tools that provide enhanced functionality for federated cloud environment, such as dynamic bandwidth allocation between cloud providers and common authentication and authorization mechanisms.
- Provide tools for application developers to automate the placement of service components, scale resources toward a full-featured PaaS offering.
- Develop mechanisms to more easily deploy and manage applications and, thus, maintain SaaS systems.
- Provide software that allows developers to ensure the end-to-end, secure use of data within their application as well as secured access to remote data sources.

CYCLONE Technological Basis and Component Products

CYCLONE incorporates and integrates the following technologies and products initially developed by partners

- **SlipStream** by SixSq
Provides a web-based interface and REST API for defining complex, multi-machine applications and automating the deployment of those applications onto cloud infrastructures.
- **StratusLab** by CNRS-LAL and StratusLab project
Complete cloud distribution that allows you to install an IaaS cloud on your own hardware.
- **OpenNaaS** by I2CAT
Open Source platform for provisioning network resources. It allows the deployment and automated configuration of dynamic network infrastructures and defines a vendor-independent interface to access services provided by these resources.
- **TRESOR and TCTP** by TU Berlin
Trusted Ecosystem for Standardized and Open cloud-based Resources and Trusted Cloud Transfer Protocol to secure SaaS applications ecosystems
- **GAAA-Toolkit and SNE-XACML** by UvA
Pluggable Java libraries to support dynamically provisioning multi-domain complex access control infrastructure for complex multi-provider cloud based services.

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For more information refer to

CYCLONE website - <http://www.cyclone-project.eu/>
CYCLONE github - <https://github.com/cyclone-project>

