

Wanhive

The Structured Overlay Network

Overview

- Executes in the Application Layer of the Network Stack.
- An experiment to harness all current research and technological developments in the area of Distributed Computing and p2p Networks.
- An attempt at building a vastly scalable, secure and reliable “*Decentralized Messaging Infrastructure*” which can support multimedia information exchange in real time between millions of users.
- Resolves Constraints on:
 - Node Throughput
 - Network Routing efficiency and reliability
 - Resource Discovery
 - Authority, Security and Accountability

Topologies

- Centralized
 - Each **Wanhive** Server can be deployed as a stand-alone server to host a variety of services and applications
- Overlay
 - **Wanhive** Servers can arrange themselves into a DHT based Overlay Network to harness the maximum capacity of the participating systems and networks through **massive replication**.

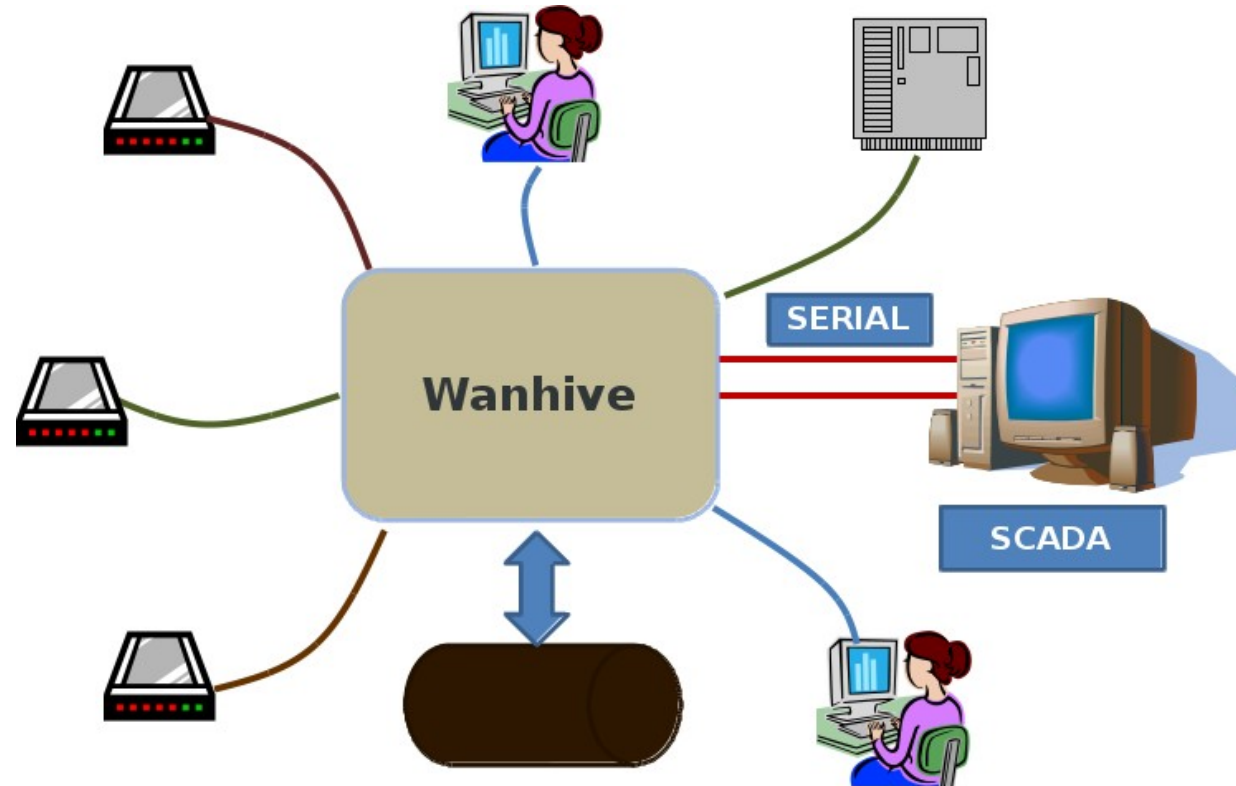
Wanhive as standalone Server

Capabilities

- Suitable For all Remote Monitoring and Control applications over TCP/IP
- Can handle thousands of clients simultaneously
- Works well on slow and unreliable connections
- Real-time communication with high throughput

Extensions

- External libraries and plug-ins 
- Middleware and APIs 
- Protocol 
- Security 



Multiple Devices and Applications, One solution

- Device-to-Device
- Device-to-Application
- Application-to-Application
- Application-to-Device

Wanhive as Standalone Server

LEAD THE RACE

Wanhive keeps itself updated with new advancements in technologies to deliver the best possible performance under heavy load.

New Age Technology

- Makes use of new functionality available in modern Linux kernels to enhance the performance and to reduce system load.
- Uses Modern IO and optimizes System Resource Usage to guarantee high availability and consistent throughput even under heavy load.

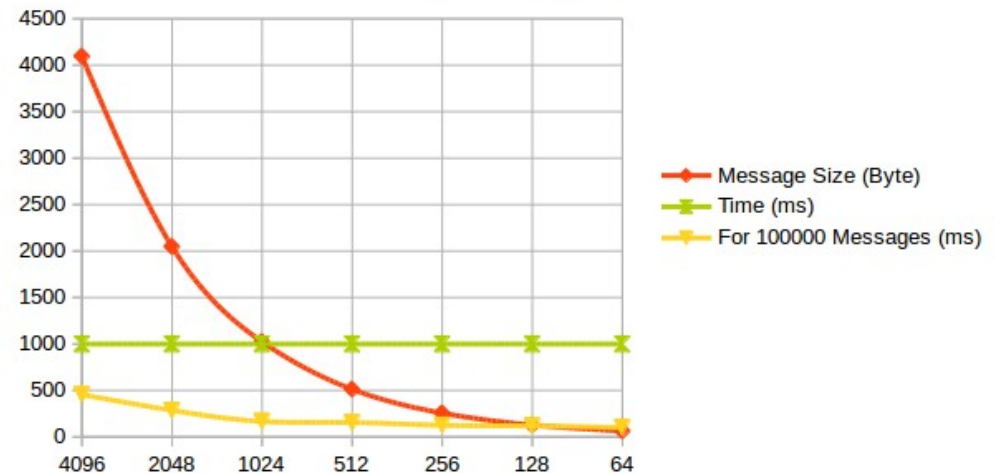
Technical Attractions

- Can process up to **1,000,000 Messages/sec** on a DESKTOP machine.
- Routing throughput of up to **850 MB/s**.
- Performance increases linearly with increase in performance of the underlying h/w.
- Protocol preserves Message Boundaries and Sequence.

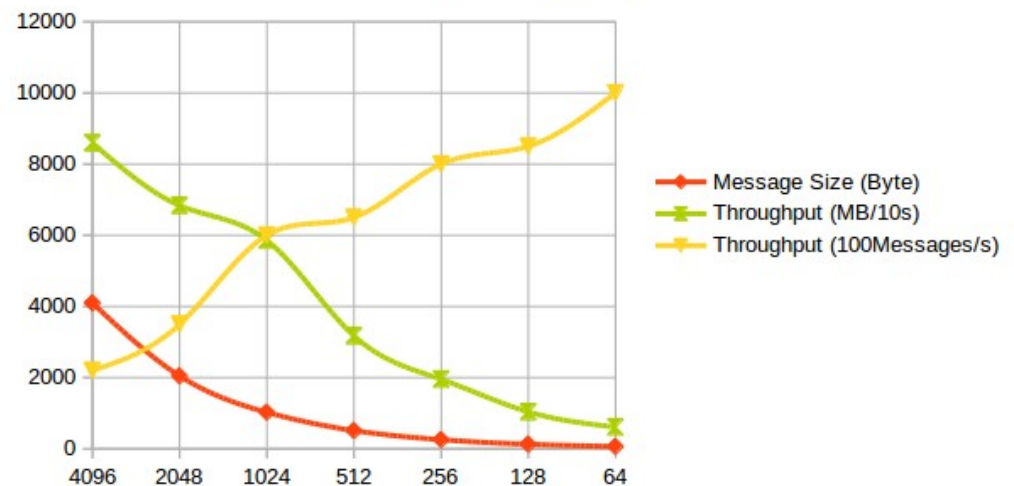
1 MB (Mega Bytes) = 1048576 Bytes

1 ms (milliseconds) = 0.001 seconds

Packet Routing (Time)



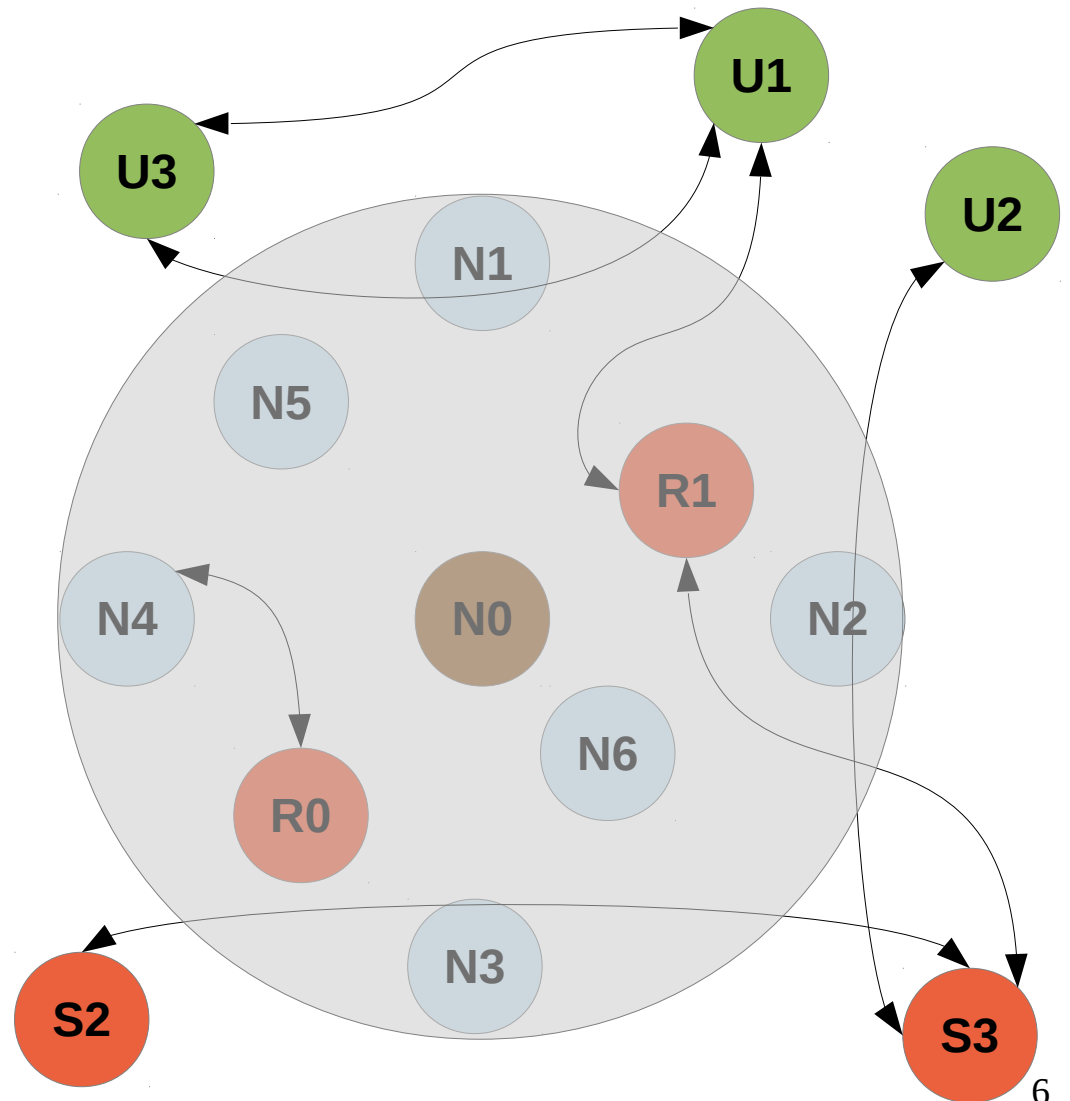
Packet Routing (Data)



Wanhive in Overlay

Basic Design Goals

- **Robust** in the face of failures, attacks and unexpectedly high loads.
- **Scalable** achieves large system sizes without incurring undue overhead.
- **Self-Configuring** automatically incorporates new resources without manual intervention or oversight.
- **Use case Neutral** a simple and flexible interface simultaneously usable by many applications.
- **Secure, Efficient and Reliable** makes use of recent advancements in technology & ongoing research in this particular area to beat the competition and to provide a secure, reliable and easily accessible environment for it's users.
- **Efficient Protocol**, preserves message boundaries (guaranteed) and sequence (best effort). Supports multi-streaming over a single connection.



Wanhive in Overlay

WANHIVE IS THE RIGHT CHOICE

- Simplifies the development of large-scale distributed Applications
- Simple API makes customization easy
- Ease of deployment and Administration
 - Built-in fault tolerance, replication, and load balancing
 - No need for change in underlay IP networks
- Improved Control, Security and Robustness for Applications like:
 - Control Systems
 - Remote Monitoring Applications
 - Defense Applications
- Generic in Nature
 - Single Shared Infrastructure can host variety of services and hundreds of thousands of users

Basic Functions

- **Discovery:** Allows users to find one another.
- **Look Up:** Allows users to search for Contents and Services over the network. Also, allows efficient message routing across the network.
- **Delivery:** Partial and/or full publishing of data, messages and services over the network.

Improvements

- **Eliminates Shortcomings:** Improvises on publicly available and proven DHT algorithm to ensure optimum balance between Security, Reliability, Scalability and Scope.
- **Improves Performance:** Improves Node and Network performance 3-10 fold compared to currently available designs.
- Better Control and Administration.
- **Supports** Near Real Time Streaming.

Comparison with other facilities

Table A. General Features

| Sn | Facility | Abstraction | Ease of use | Scalability | Load Balance | Generic |
|-----------|-----------------|--------------------|--------------------|--------------------|---------------------|----------------|
| 1 | Wanhive | High | High | Medium | Yes | Yes |
| 2 | DHT | High | Medium | High | No | No |
| 3 | Centralized | Medium | Medium | Low | No | No |
| 4 | Decentralized | Medium | High | Low | No | No |

Table B. Architecture

| Sn | Facility | Fault Tolerance | Self Organizing | Administration | Security |
|-----------|-----------------|---------------------------|------------------------|-----------------------|-----------------|
| 1 | Wanhive | High | Yes | Medium | High |
| 2 | DHT | High | Yes | Low | Low |
| 3 | Centralized | Low | No | High | High |
| 4 | Decentralized | Depends on implementation | Yes | Low | Low |

Comparison with other facilities

Table C. Functionality

| Sn | Facility | Efficiency | Quality of Service | Robustness | Autonomy |
|-----------|-----------------|-------------------|---------------------------|-------------------|-----------------|
| 1 | Wanhive | High | High | High | Medium |
| 2 | DHT | Medium | Medium | Medium | High |
| 3 | Centralized | Low | Medium | Low | Low |
| 4 | Decentralized | Low | Low | High | High |

Table D. Security

| Sn | Facility | Availability | Authenticity | Anonymity | Access Control |
|-----------|-----------------|---------------------|---------------------|------------------|-----------------------|
| 1 | Wanhive | Medium | High | Medium | Yes |
| 2 | DHT | High | Low | High | No |
| 3 | Centralized | Low | High | Low | Yes |
| 4 | Decentralized | High | Low | High | No |

Usage

WANHIVE OFFERS RIGHT SOLUTIONS

Impressive and unparalleled features/capabilities of **Wanhive** will make it suitable for a wide range of applications.

General Usage

- Data Sharing
- Remote Procedure Calls (RPC)
- Distributed Computing
- Facility Management
- Communication Primitives
- Messaging and Multimedia Streaming Services
- Large Scale ubiquitous computing
- Trading Platforms
- Real-time data-acquisition, analysis and re-transmission

Usage by Sectors

- General Public and Offices
- Utilities
- Defense
- Transportation and Logistics
- Disaster Prevention and Management
- Surveillance and Policing
- Large Scale Control Systems

Thank You 