

allium







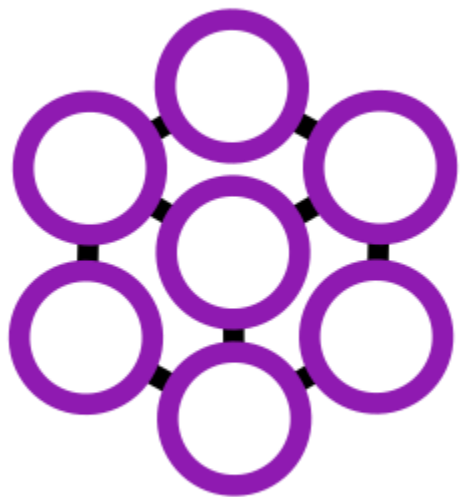












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# Network Agnosticism



# Cross-Platform Virtual Machine

Near hardware-level performance with no browser overhead

# Unrestricted Peer-to-Peer

Eliminate mandatory boundaries between devices

# Automated Data Synchronization

Analyze shared memory usage and only transfer necessary data

# 1. Peers Log In



desktop-a

```
./allium
```

desktop-b

```
./allium
```

## 2. A Program is Assembled into a Map



desktop-a

desktop-b

```
> map program
```



### 3. The Program can be Executed from any Peer



desktop-a

program.map

```
10101000
```

```
0111011
```

```
010101011000
```

```
./allium program
```

desktop-b

program.map

```
10001010
```

```
101000101010
```

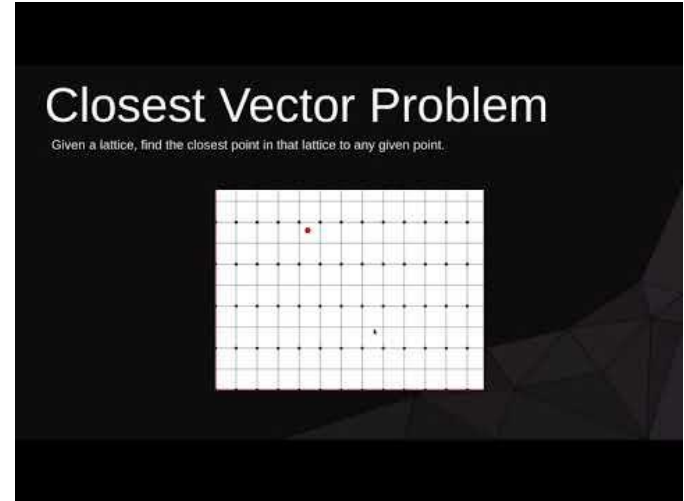
```
101101
```

```
./allium program
```

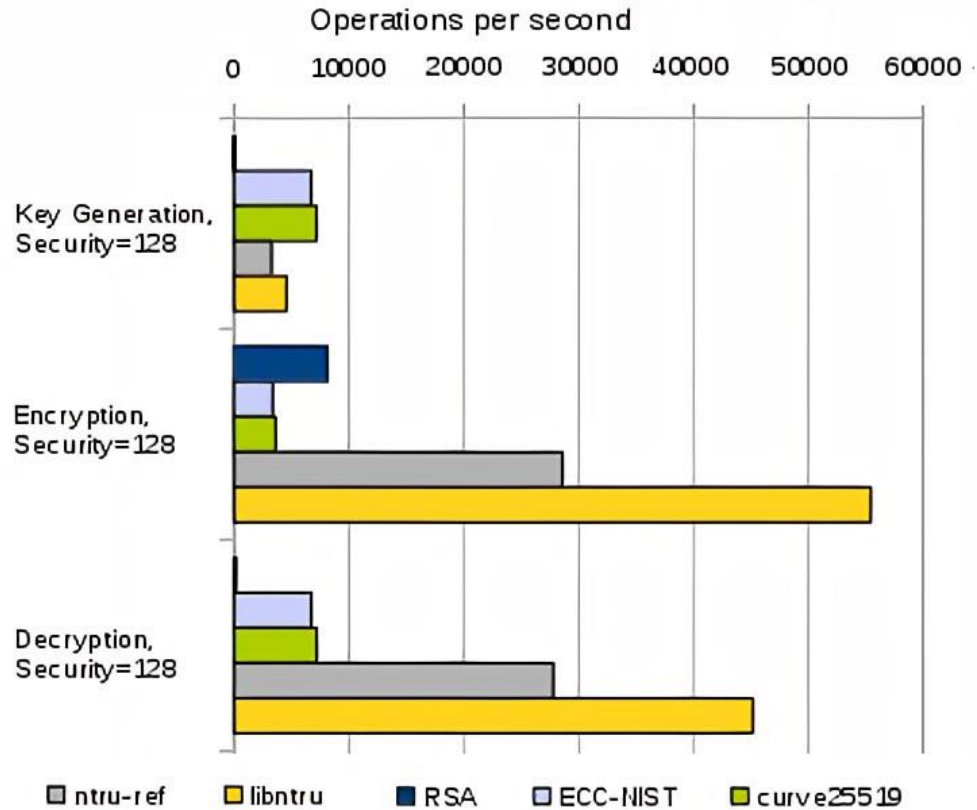
# NTRU Cryptosystem



- Quantum Resistance
- Relies on the CVP in lattices
- Very fast encryption and decryption



*Lattice-Based Cryptography -  
A New Quantum Era of Encryption*



# AVM Bytecode



- Designed to minimize program size
- Based on the Little-Man-Computer instruction set
- Good baseline for later expansion
- Documentation available at [github.com/danstuff/allium](https://github.com/danstuff/allium)



# AVM Bytecode



- Simple test program that performs some math operations
  - Done in 153.7 microseconds in AVM (178 bytes)
  - Done in 340 microseconds in JavaScript/HTML (351 bytes)

# 55%

Faster than JavaScript  
and 49% smaller

# Device Identifiers



- Always start with an asterisk @
- All following code will be filtered for a specific device
- Two reserved identifiers:
  - @any - run on the first available device (the default behavior) and wait to continue running until any one device responds.
  - @all - run on every device and wait to continue until all devices respond (or time out).



# Simple Chat Room Program

```
# Transfer literal values to memory
```

```
@all
```

```
TLM -3 1
```

```
TLM -8 2
```

```
# Read input from any device
```

```
@any
```

```
TIM 1 3 32
```

```
# Output to every device
```

```
@all
```

```
TMO 3 1 32
```

```
# Repeat the last 2 operations
```

```
BRA 1 2
```

```
HLT
```



# Potential Applications



- IoT networks
- Shared desktop / notification system
- Remote storage access
- Painless automated backups

# Future Additions



- Program compilation
- USB interfacing
- Graphics and GPU utilization



# Thank You!

[github.com/danstuff/allium](https://github.com/danstuff/allium)

[yostlabs.net](https://yostlabs.net)