

DeveelDB in the Cloud (CloudB)

FOSDEM 2011
Mono Dev Room

Bruxelles, 5 February

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 **deveel db**

The Presentation

1. Background
2. Solution
3. Architecture
4. Community
5. Future Developments
6. Questions



The Background.

The Main Players

- Relational Databases
 - Structured (data modeling)
 - Consistent (data integrity checks)
 - Standard Syntax (SQL – PL/SQL, T-SQL)
- NoSQL (Mongo, Couch, BigTable, Cassandra)
 - Fast (distributed computation)
 - Scalable (networked storage)
 - Open Protocols (HTTP, JSON, XML, etc.)

What Else?

- Parallel Databases
 - Distributed Storage
 - Distributed Computation

- Resource Sharing
 - Shared Memory
 - Shared Disks
 - Shared Nothing

The Solution.

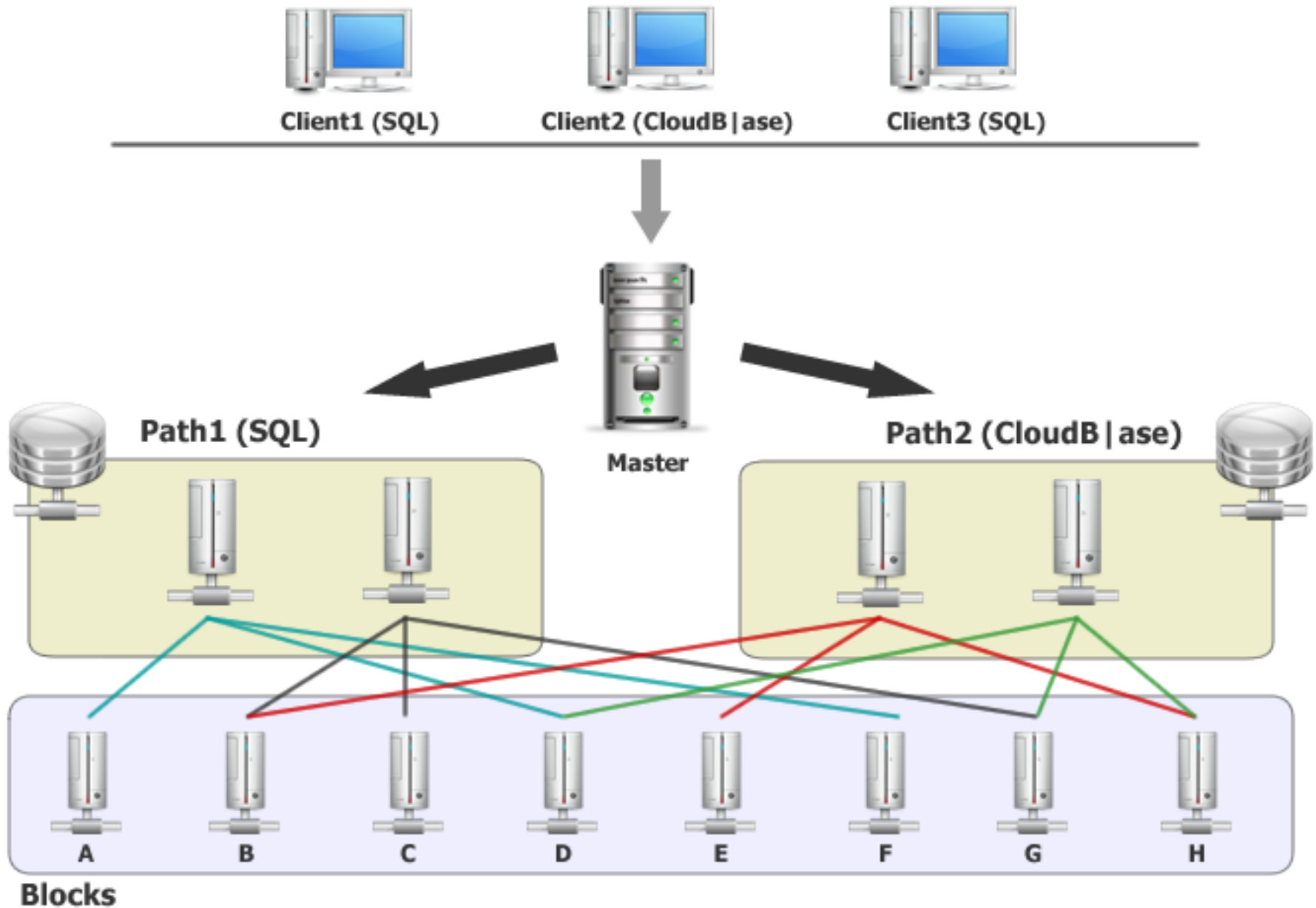
Model Agnostic

- Pluggable
 - No default data model
 - Data Process API (Path Functions)
 - Delegated data processing
 - Consensus on transaction commits
 - Multiple Path Types
 - In the same network

Scalable

- Master Nodes
 - Handle the network
 - Entry point for clients
- Root Nodes
 - Handle Paths
 - Use and share blocks
- Block Nodes
 - Manage data storage and processing

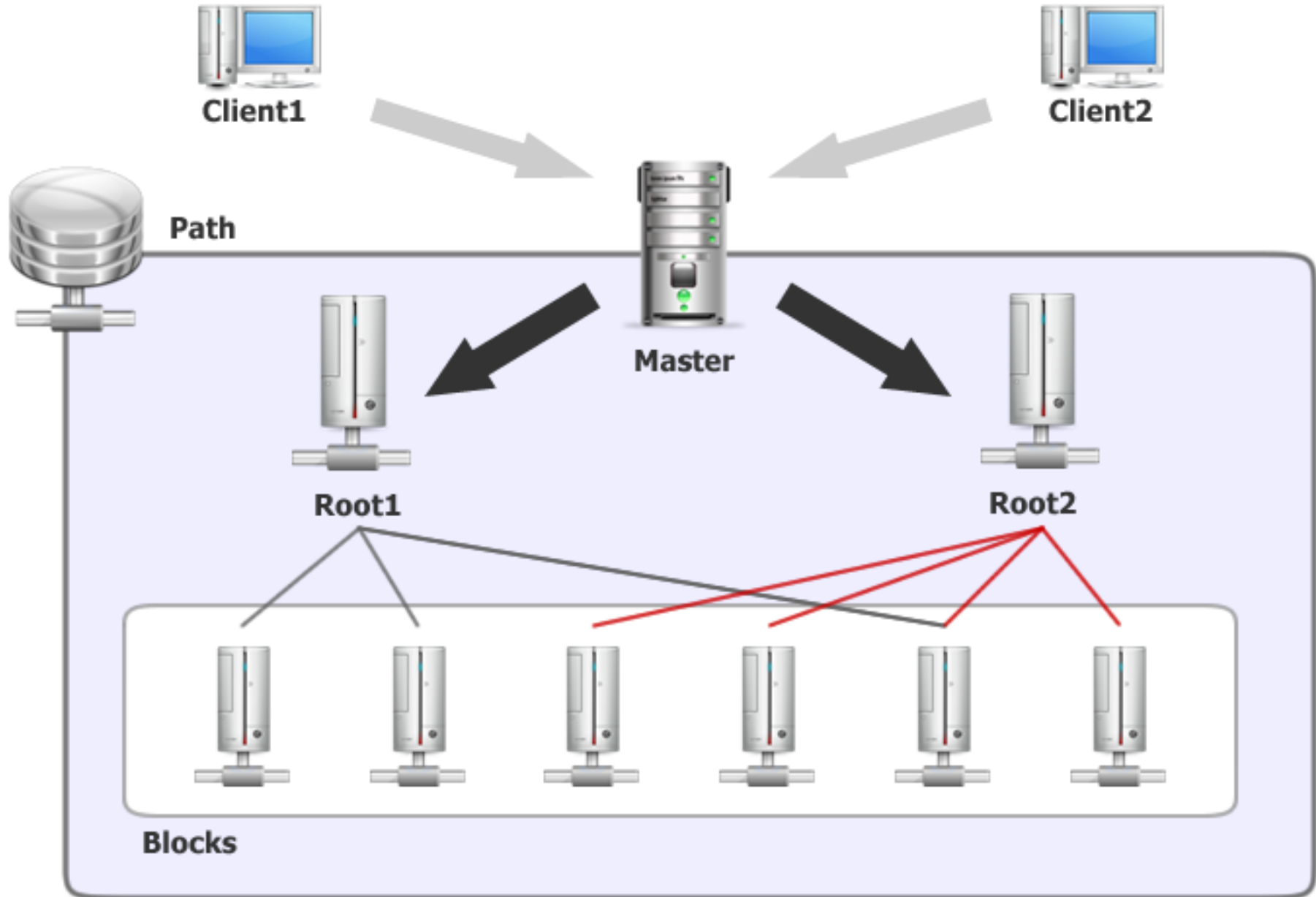
A Simple Network



Paths

- Define the data model
- Process data at commits
 - Green light to data storage (consensus)
 - Proprietary implementation
- Share memory
 - Path roots handle block data portions

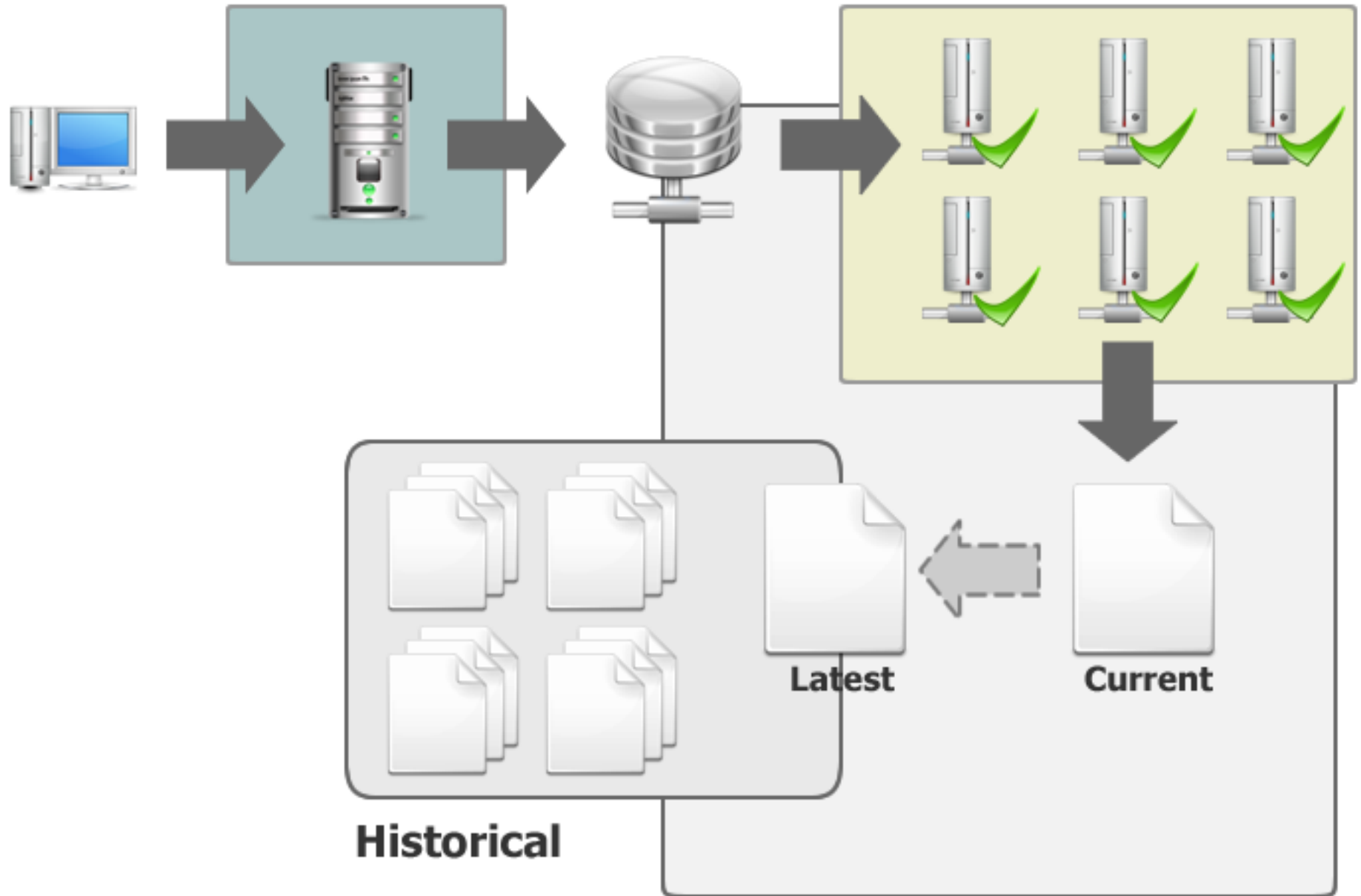
Paths (An Example)



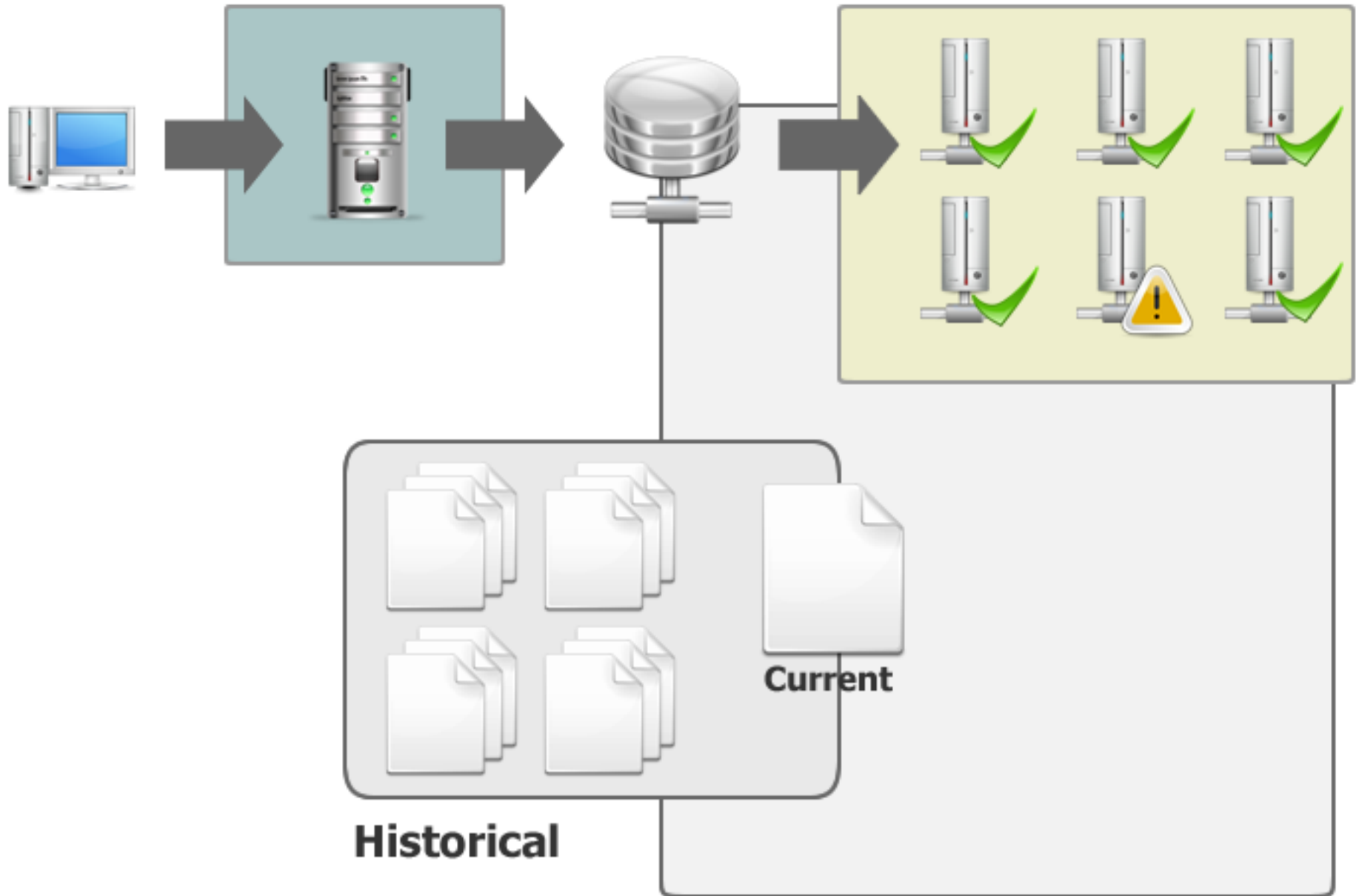
Transactional

- Optimistic Concurrency Control
 - Mandatory
 - Consensus by Paths
- Isolated Snapshots
 - Historical Snapshots Accessible
 - Restoreable
- Versioned data
 - Each commit creates a new branch

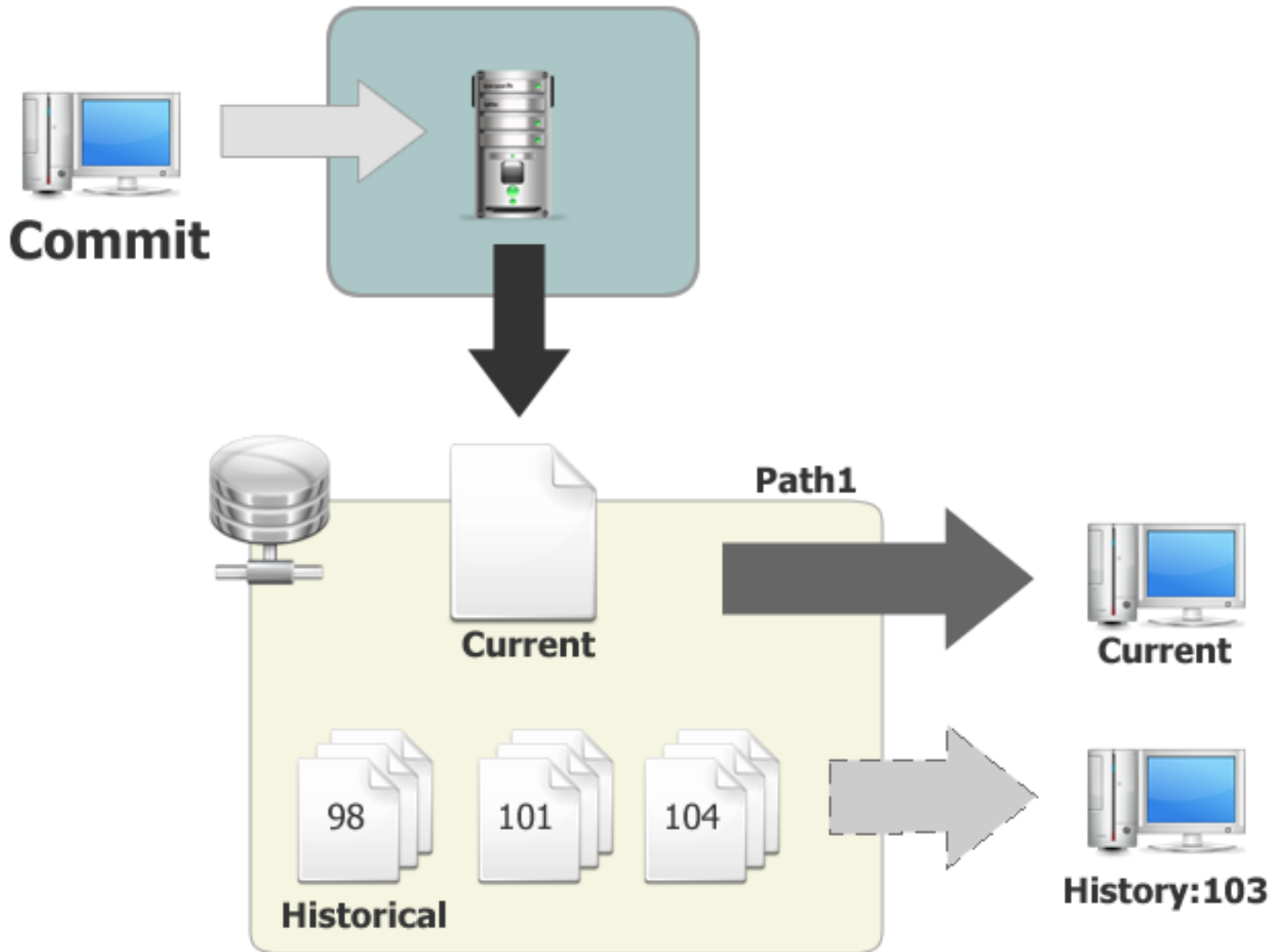
Commit (Success)



Commit (Failed)



Version Access



Setup a Network (cadmin / TCP/IP)

Starting a Node of the Network

```
antonello@deveel~: mono mnode -port 3500
```

Starting a CloudB Network

```
cloudb> start role manager on 192.168.0.32:3500  
cloudb> start role root on 192.168.0.33:3500  
cloudb> start role block on 192.168.0.33:3500  
cloudb> start role block on 192.168.0.34:3500  
cloudb> start role block on 192.168.0.32:3550
```

Starting a Path

```
cloudb> add base path testdb to 192.168.0.33:3500  
cloudb> add path Deveel.Data.BasePath to 192.168.0.33:3500
```


Programmatic Access (CloudB)

```
using System;
using Deveel.Data;
using Deveel.Data.Net;

namespace FOSDEM2011 {
    public class Test {
        public Test () {
            TcpServiceConnector connector = new TcpServiceConnector("123456");
            NetworkClient client = new NetworkClient(new TcpServiceAddress("192.168.0.32", 3500), connector);
            client.Connect();

            DbSession session = new DbSession(client, PathName);
            DbTransaction transaction = session.CreateTransaction();
            transaction.Dispose();
        }
    }
}
```

Software Architecture

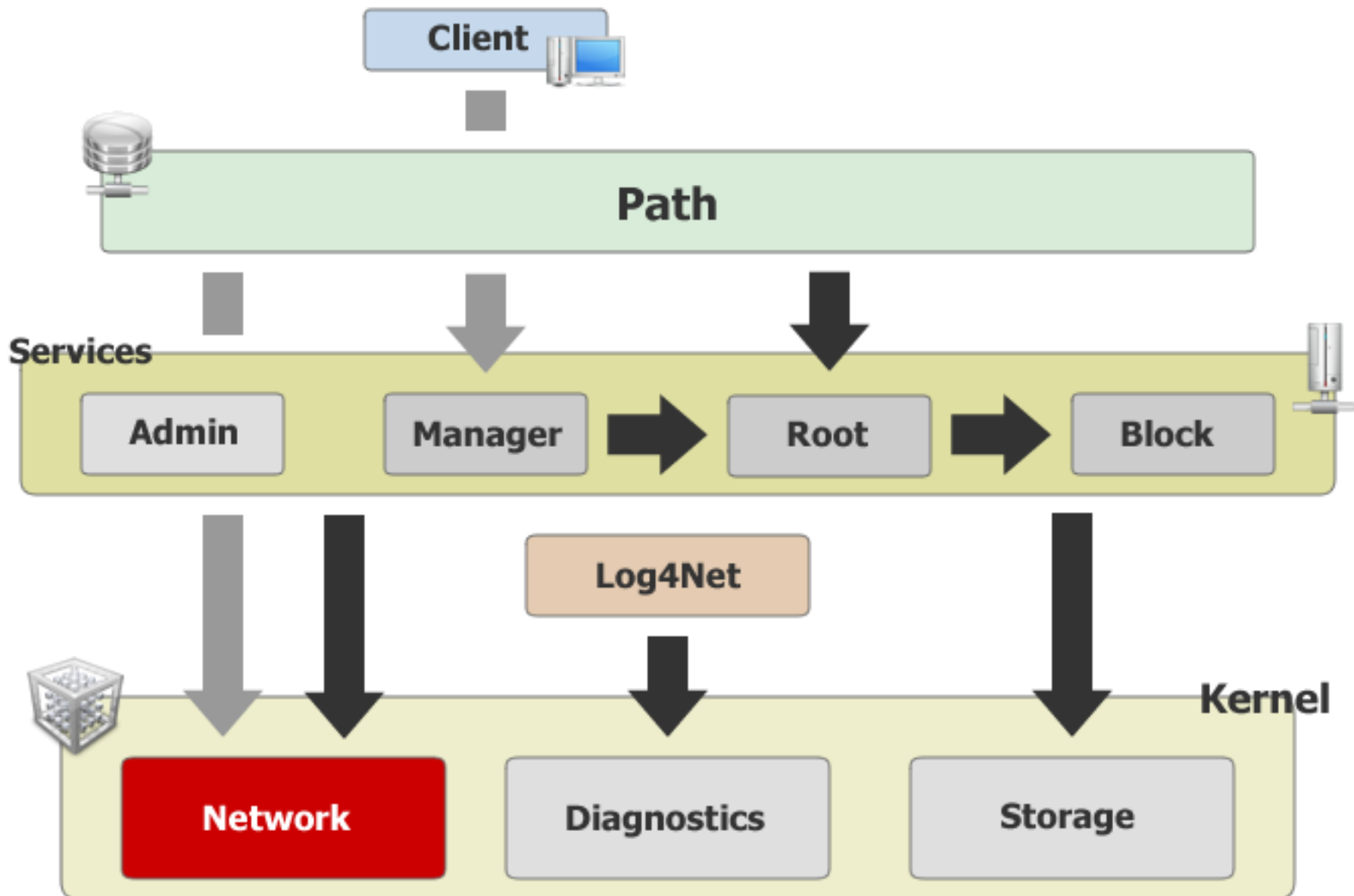
Modular & Flexible

- Kernel Library
 - Data Management
 - Network
 - Configuration, Diagnostics
- Path Libraries
 - CloudB|ase (string key/value, binary files)
 - SQL (experimental)
 - CloudbObj (planned)

DataFile Class

- Spans data across the network
- Can be obtained by Transaction
- Streamable

Component Stack



Applications

- mnode (machine node)
 - Standalone Console Server
 - Daemon (experimental)
 - Exposes a machine to the network
- cadmin (cloud administration tool)
 - Console Application (REPL)
 - Interacts with Admin Service of a Node

The Community

Mono

- Entirely Written in C# Language
 - Profile .NET 2.0
 - Compiled with Nant (isolated environment)
 - Core library only needs corlib
- Optimized For Mono Framework

Open Source

- Kernel Library
 - GNU LGPLv3
- Command-Line Tools
 - Apache Public License 2.0

The Future

Version 1.0

- Node Services (Admin, Master, Root, Block)
- Configuration
- Diagnostics
- Communication Protocols (HTTP, TCP/IP)
- Messaging Formats (XML, Binary, JSON)
- CloudBase

Version 1.5

- Kernel
 - 128-bit Addresses
 - Multiple Roots per Path
 - Message Queue
- Path Libraries
 - Full SQL Support
 - OODB
 - Graph

Some References

Website

<http://code.google.com/clouddb>

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deveel db

Fin