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CORAL Server Development Status

Zsolt Molnár - CERN-IT-DM

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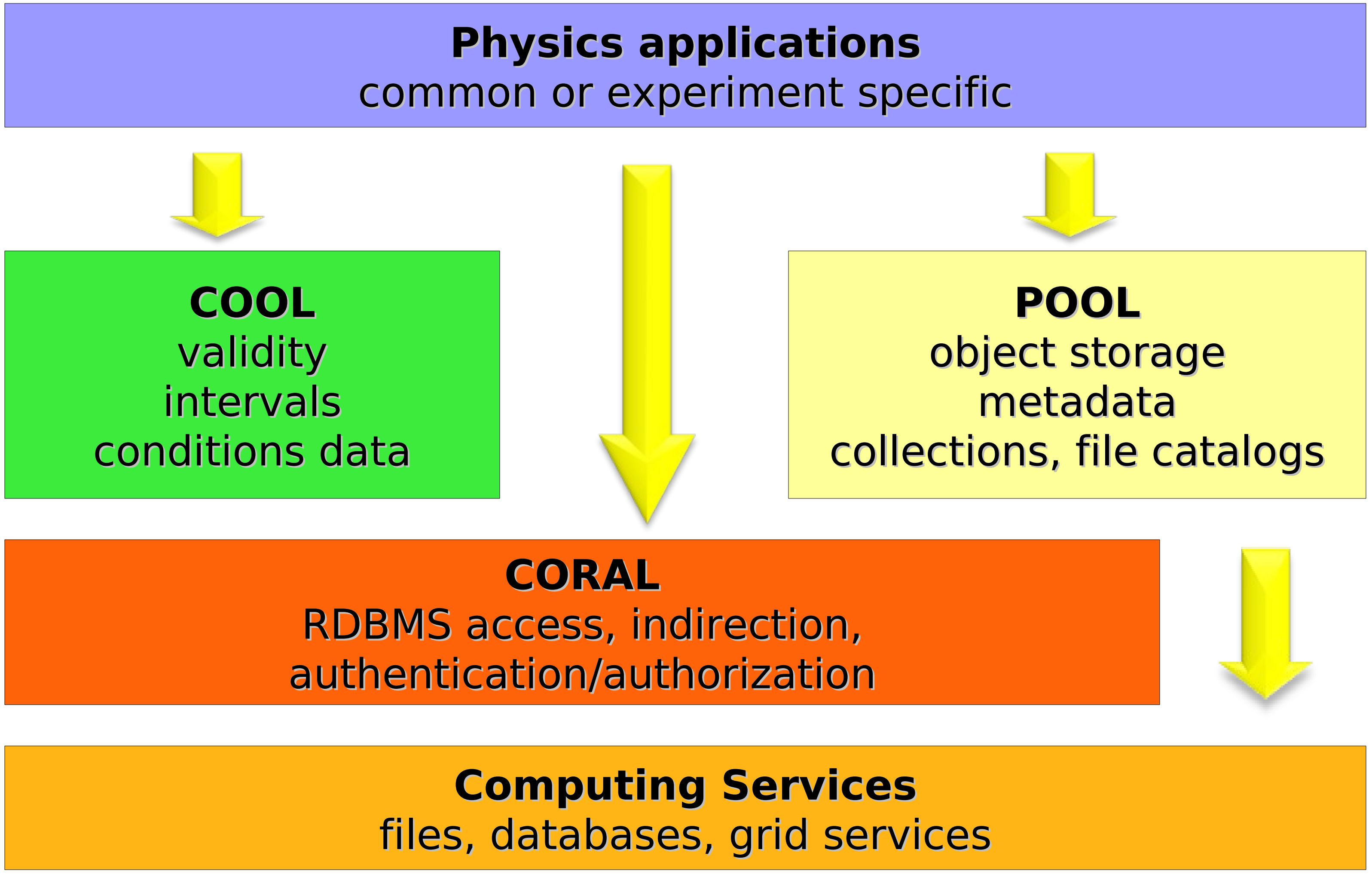
Zsolt.Molnar@cern.ch

CORAL


Physics applications
common or experiment specific
COOL
validity intervals conditions data
POOL
object storage metadata collections, file catalogs
CORAL
RDBMS access, indirection, authentication/authorization
Computing Services
files, databases, grid services

Data Management

CORAL Status

- Near maintenance phase
  - Last new feature request: June 2008
  - Number of new support/bug requests: ~4-5/month
  - Open cases: 20 support, 28 bug
- Difficult staffing status
  - January: 5 staff, now: 1.2 staff + 0.5 tech, student
  - CoralServerProxy: 1 developer from SLAC
  - Emphasis on CORAL server
- Next major release: 2.1.0 (December)
  - SEAL free
  - First official CORAL Server included
- ~78000 C++ lines, ~6500 Python lines

Problems addressed by CORAL Server

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- Access and security problems
  - Oracle does not support grid authentication
  - Exposed security holes
- Software licensing problems
  - CORAL clients link against DB access libraries
    - Configuration management, export limitations
- Performance problems
  - Oracle spawns many idle processes
  - Waste of CPU and server resources

Solutions provided by CORAL Server

- **Access and security**
  - Database servers are not visible from Internet
  - CORAL server is the gateway, handling GSI
- **Software licensing**
  - CoralAccess plugin
    - One single plugin for all the database backends
    - Pure CORAL code
    - Transfers general representation of the relational operations through the network
- **Performance**
  - CoralServerProxy module, developed at SLAC
  - A network of caching proxy servers between the clients and the CORAL server

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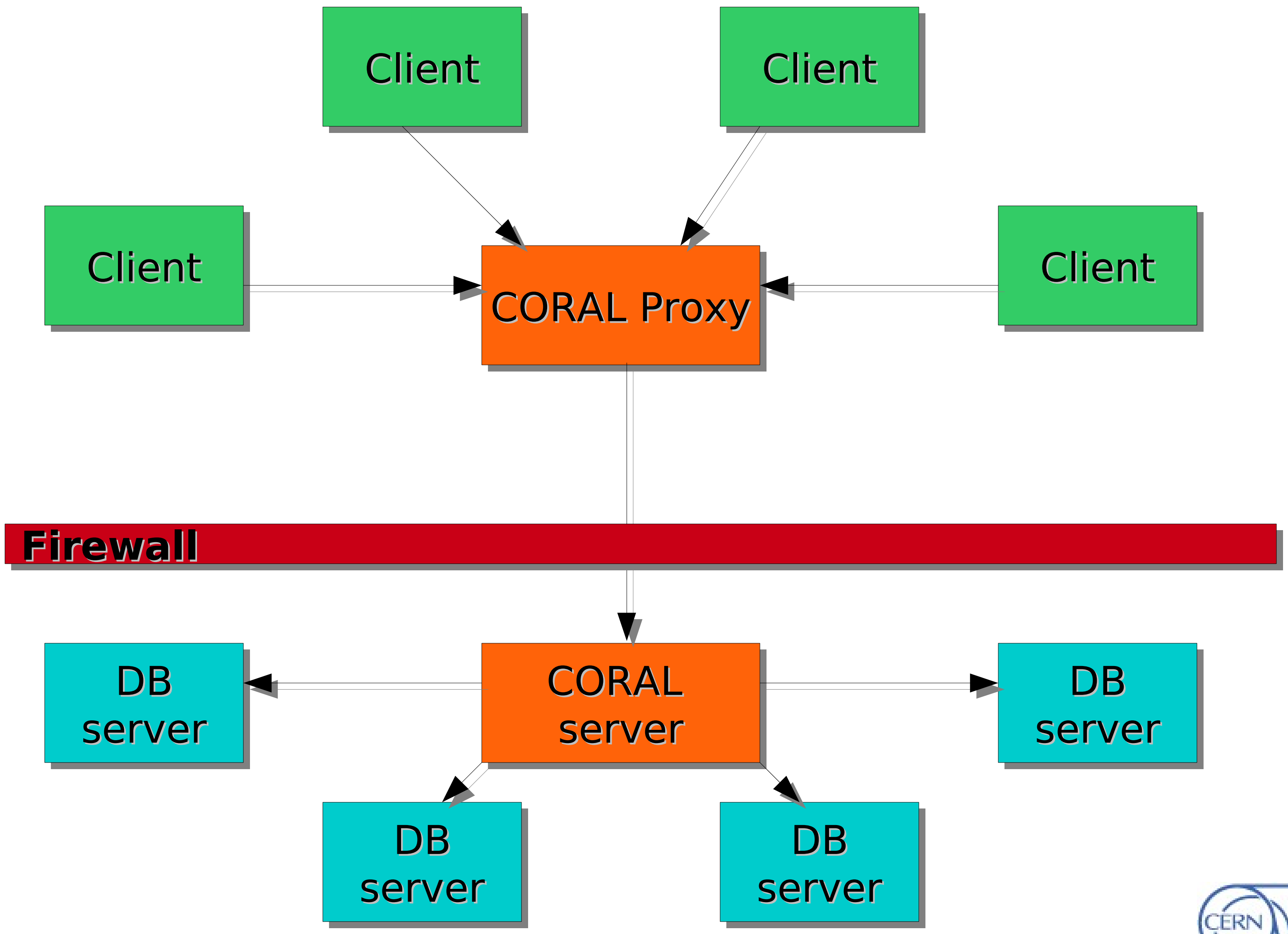
Deployment example



Data Management

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CH-1211 Genève 23
Switzerland
www.cern.ch/it

Progress from the last meeting

- Last AA presentation was: April 21
- Plan was: full SW release in October
- Plan now: SW release with read-only functionality in December
  - CORAL Server officially in CORAL 2.1.0
    - December release
    - No SEAL
  - CORAL 2 branch not yet integrated on ATLAS side
    - Tricks, hacks for testability on our side
  - Reduced CORAL staffing
- Tests: CORAL Integration tests, ATLAS HLT tests, COOL test suite
  - Still problems

Communication protocol

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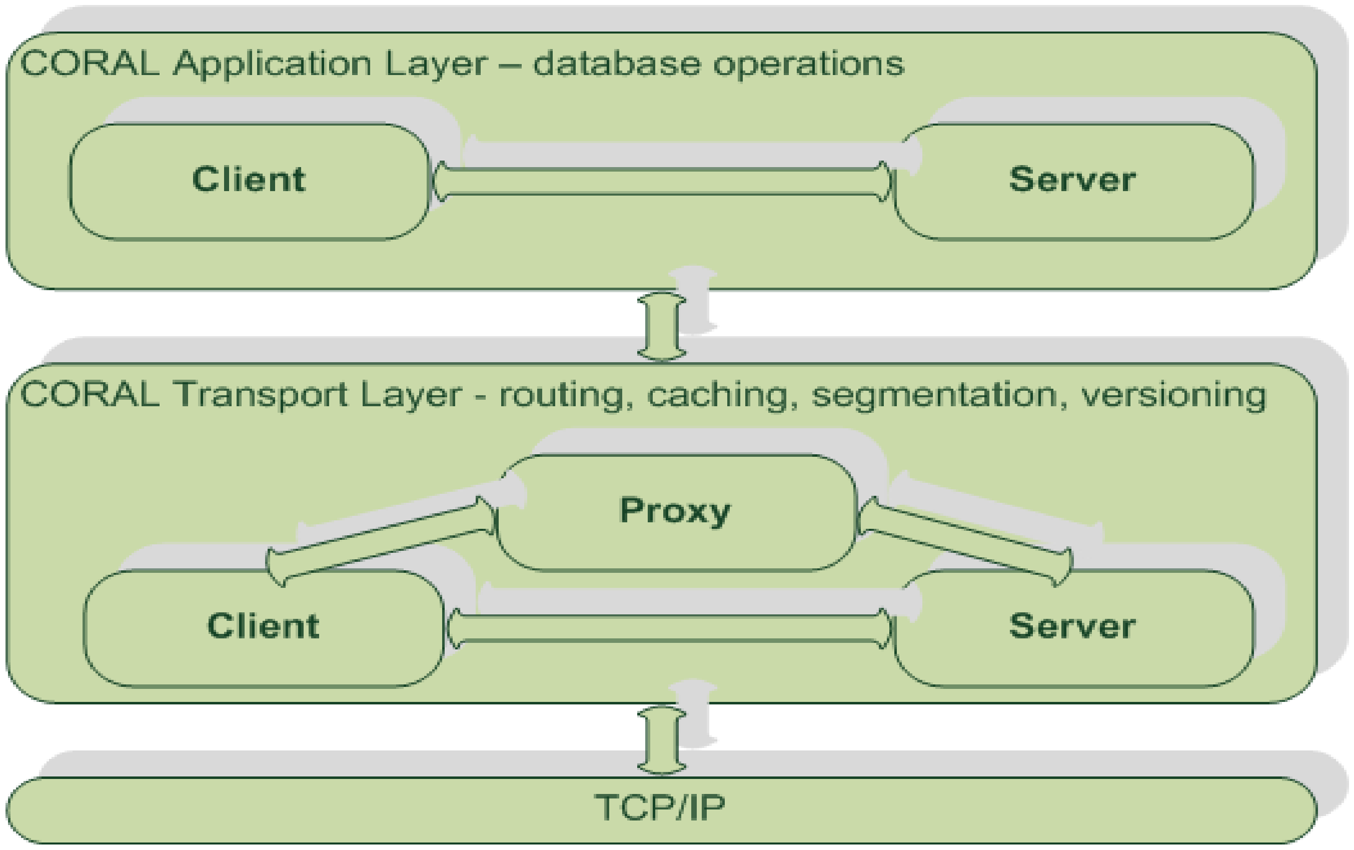
Layered communication protocol


CORAL Application Layer – database operations
Client
Server
CORAL Transport Layer - routing, caching, segmentation, versioning
Proxy
Client
Server
TCP/IP

Data Management

Communication protocol

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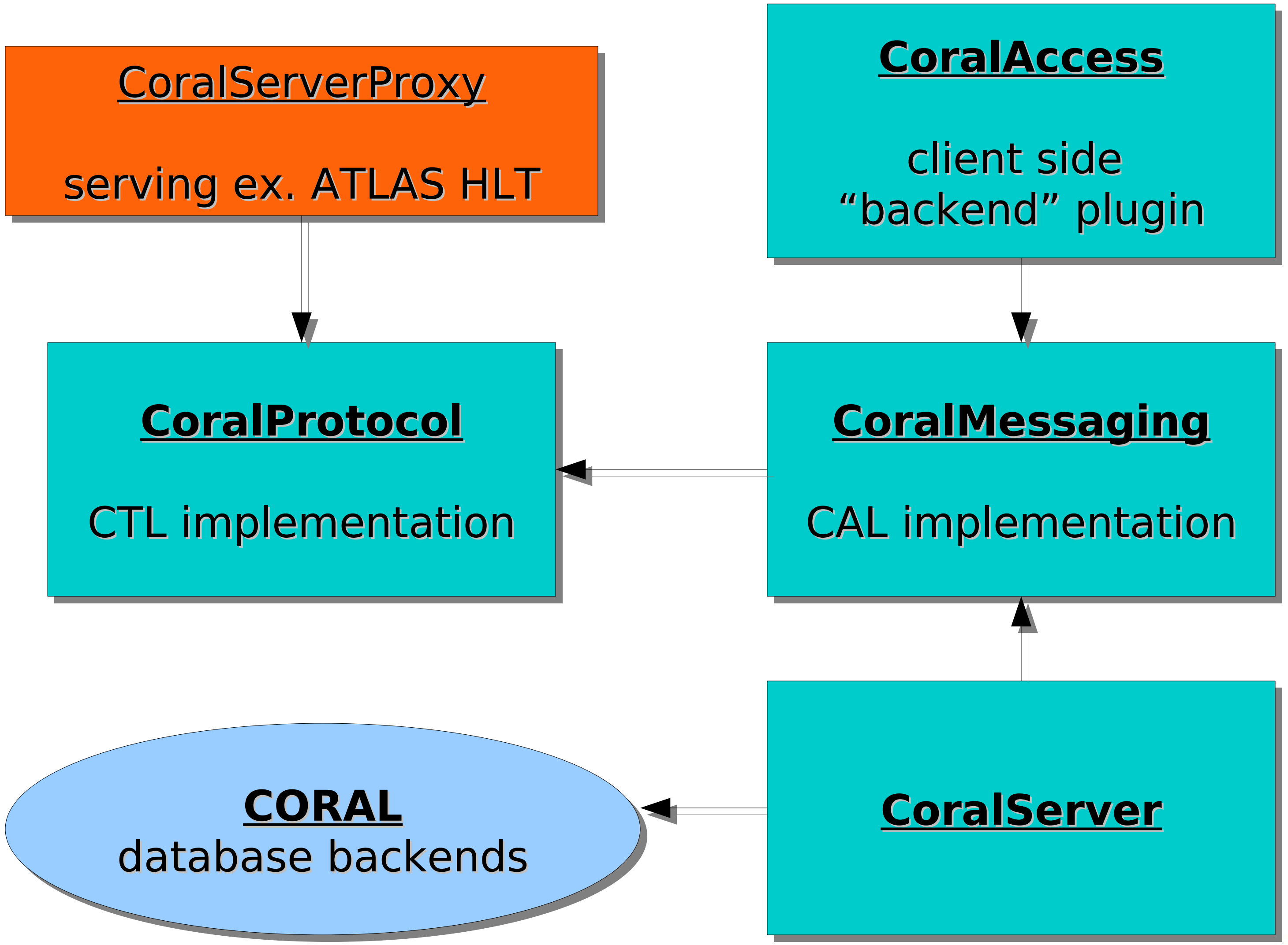
- Binary protocol
- Support of different architectures, translation
- Lead by cache-ability
  - Responses are hash-ed by the corresponding requests
  - Determine semantically identical requests
    - Those lead to identical hash keys
  - Different architectures and clients should generate the same key
  - Open for future optimization
    - Did we achieve the above goals?
    - Compressing? Crypt-ing?

Communication protocol

- Joint development with SLAC
- CTL based on ATLAS DbProxy
- Multiple protocol version on server side
- Single protocol version on client side
- Updating operations are not cached
- Cache-ability can be controlled
- Based on message exchanges
  - Messages may be segmented
    - We call them packets...
  - The segments are individually hash-ed

New CORAL packages



The Server

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- **Multi-threaded server**
- **Message handler plugins according to protocol version**
  - Determined by packet header
- **Multiplexing database sessions and transaction**
  - The proxy is a single client
- **Almost stateless**
  - Only the transaction state is shared between message handlers
- **The backend is encoded in the “schema”**
  - CORAL connection string: *oracle://oracleserver:port/schema*
  - CoralAccess connection string: *coral://coralserver:port|oracle://oracleserver:port/schema*

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Development, deployment

- SEAL free support only
  - But temporary back-ports to SEAL-ed CORAL
    - Extra burden when releasing engineering versions
- Client: planned support for all AA platforms
- Server: Linux/OSX support only
- ~15000 lines of code
  - With using extensive meta-programming techniques
- *Coral{Server,Messaging,Protocol}*: design is waiting for review, optimizing, bugfixing
- *CoralAccess*: major refactoring is ongoing
- *CoralServerProxy*: final version

Schedule, resources

- **December, 2008: first official release**
  - Part of CORAL 2.1.0
  - Read-only functionality only
  - Should already be used in data taking
- **Update, security functionality after that**
  - Security: ~February, 2009 ?
  - Update: ~April 2009 ?
- *http://pool.cern.ch/coral*

People

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- Contributing to CORAL: *Z. Xie* (CERN)
- Contributing to CORAL Server: *A. Kalkhof* (CERN)
- Contributing to planning, organizing: *D. Duellmann, A. Valassi* (CERN)
- CoralProxyServer: *R. Bartoldu, A. Salnikov* (SLAC)