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Replication & Database Security

Char(10)
Oxford, United Kingdom

Magnus Hagander
Redpill Linpro AB

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Uh. Security?

- Isn't this about:
  - **C**lustering
  - **H**igh **A**vailability
  - **R**eplication

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Uh, Security?

- Even more important in a distributed world
- Many different users, hosts and networks involved
- What do you *relly* know about «your» cloud?

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Security with PostgreSQL replication

- Applies differently to different systems
- «Slony-style»
  - Includes Londiste, Bucardo etc
- «PITR-style»
  - Warm/Hot standby, streaming repl, etc

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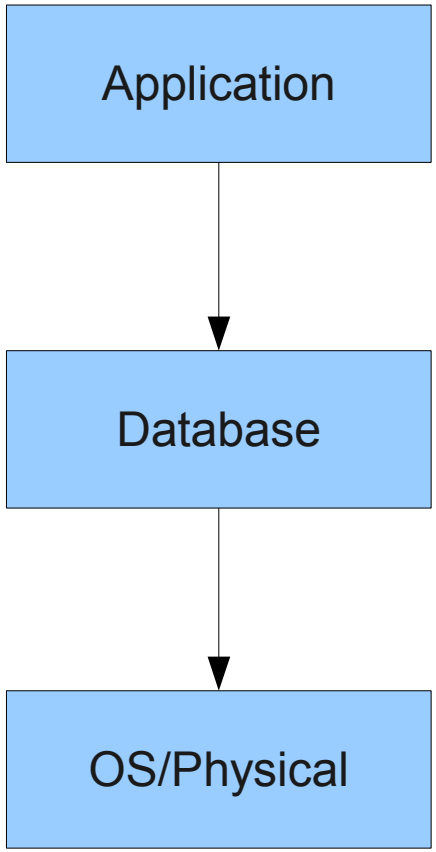
Steps to security



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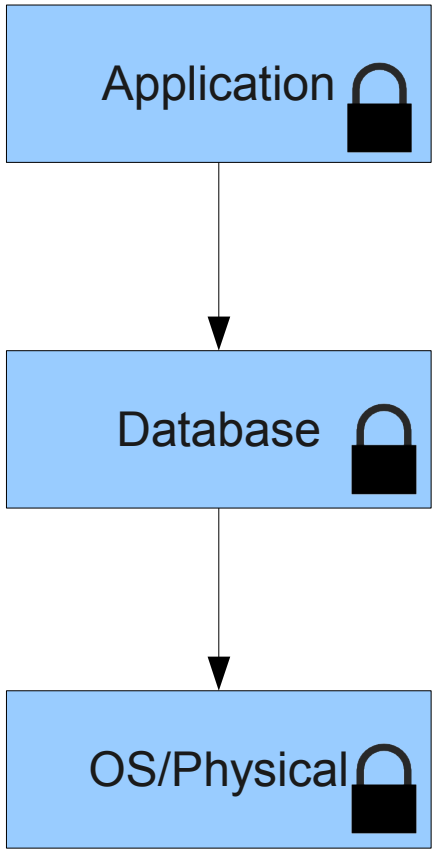
Steps to security



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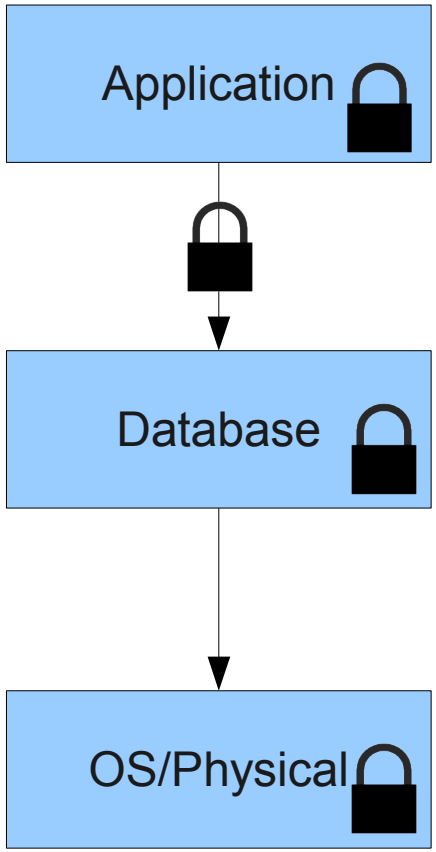
Steps to security



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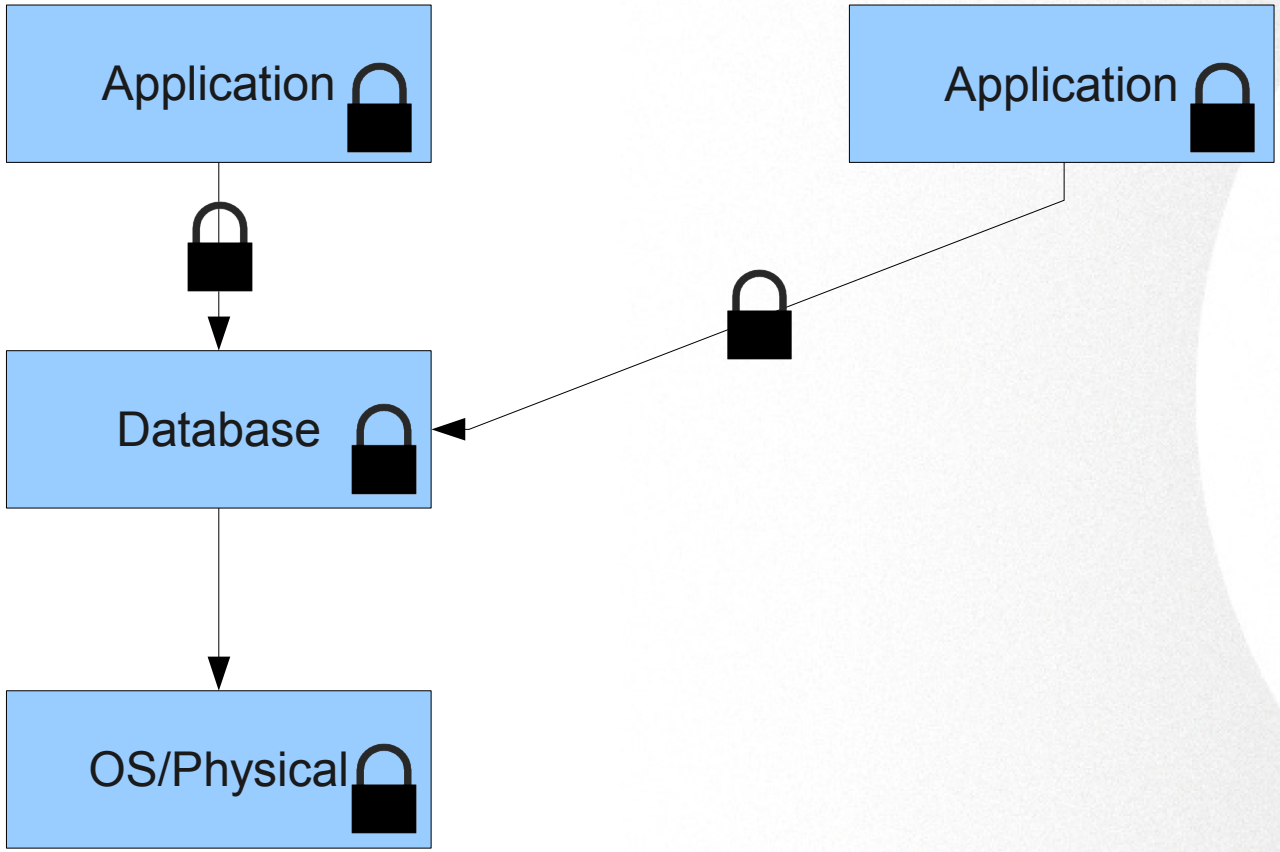
Then we add distribution



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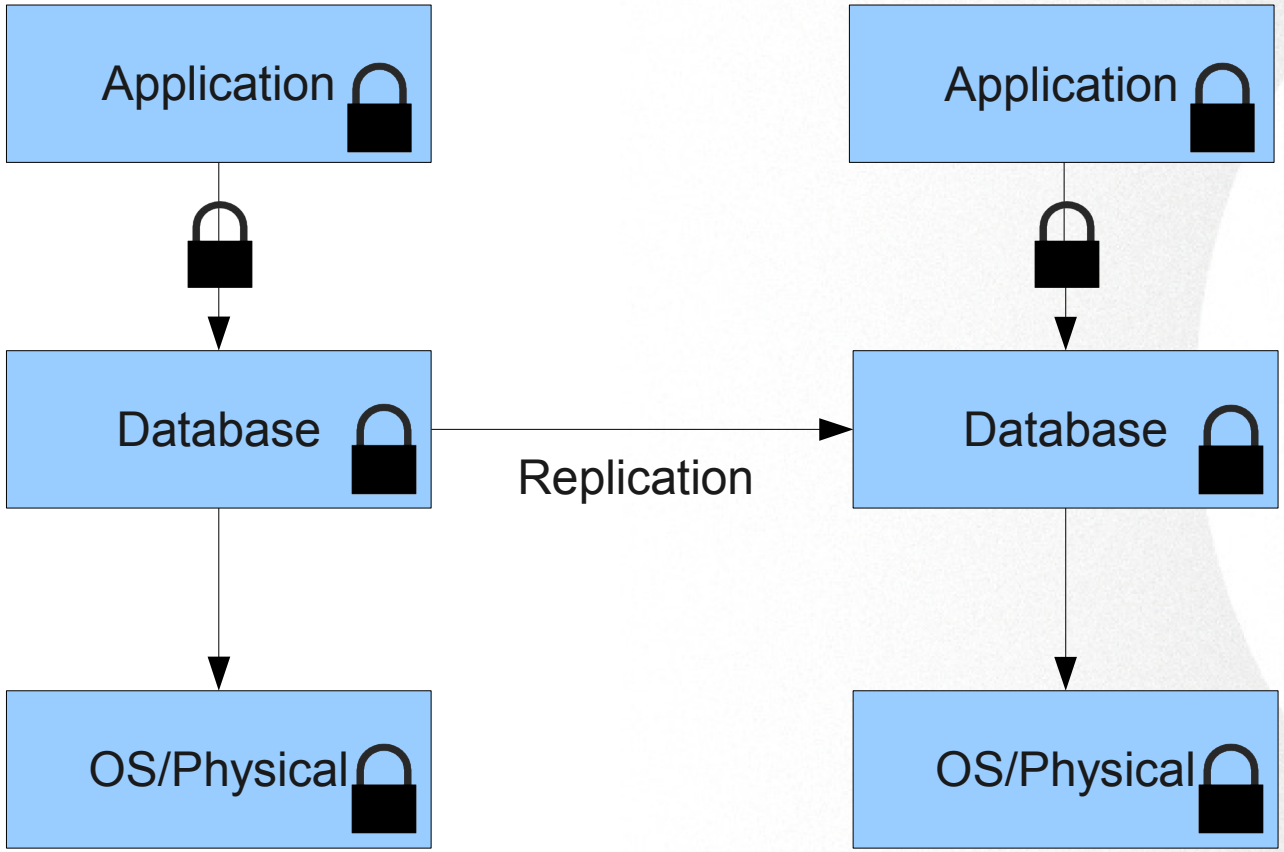
Then we add distribution



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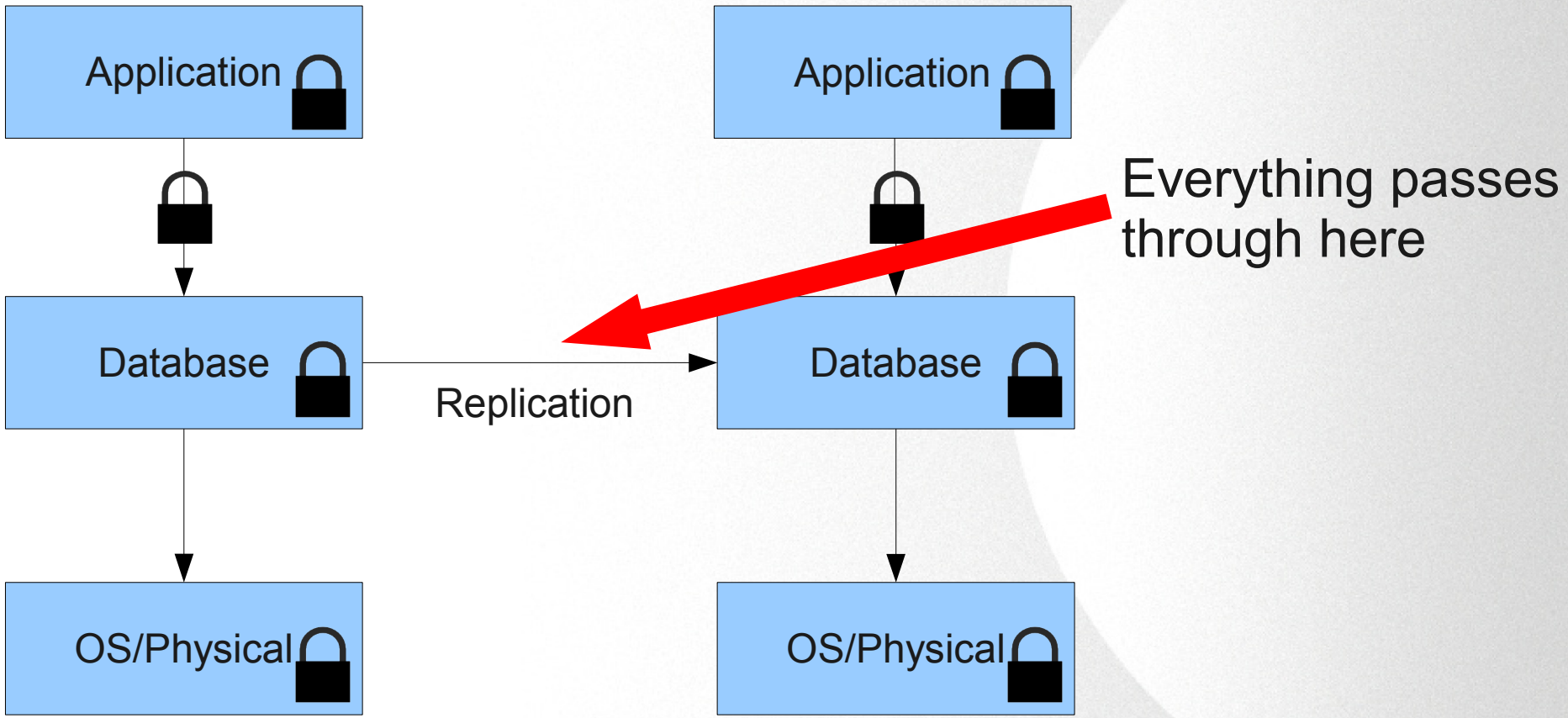
Keys to the kingdom



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Over the replication channel

- Data is unencrypted (usually)
- Data is unfiltered
- Data is *assumed valid*
- And yet...
  - Reading the data may not be the biggest problem

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Slony-style systems

- Requires high-priv account
  - Or if restricted, still full data access
  - Read and write
- In both directions
- *Not* restricted to replication

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Slony-style systems

- Probably most common:
  - User: slony
  - Password: slony
- Second most common?
  - User: slony
  - Password: <none>

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So what can we do?

- Use a *strong* password for replication user
  - There are no manual logins after all
  - Don't even consider «trust»
  - Use certificates!
- Use *different* replication users for different databases/parts
  - Restrict damage

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Utilize pg_hba.conf

- Allow replication user *only* from replication partners
- Allow *only replication user* from replication partners

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But....

- My replication connection is on a secure network!

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But....

- My replication connection is on a secure network!
- No, it's not. Really.
  - Far too valuable to be «assumed secure»

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So secure the connection

- Enable SSL
- *Require* SSL
  - (on both client and server)
- Overhead actually not so bad
  - Slony uses persistent connections
- That's the easy part...

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Configure (limited) PKI

- Set up PKI
  - Just for replication if not used for app
- Hand out both client and server certificates
- *Validate* certificates
  - libpq: sslmode=validate-[ca|full]
  - pg_hba.conf: clientcert=1

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Warm/Hot Standby

- Based on copying files
- Files are *not* signed/verified
- Transport security is handled outside

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Transfer user

- Always use a separate user
- *Don't* use the PostgreSQL service user

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Secure transfer

- rsync+ssh
  - Security through SSH
  - Integrity/atomicity through rsync
- Use SSHv2 (but you knew that)
- Transfer/verify server-side SSH key!
- Use StrictHostKeyChecking=yes

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Secure transfer

- Use ~/.ssh/authorized_keys
- *Restrict command access*
  - *Only* allow rsync access

```
command="rsync --server --sender -vlogDtpre.i . wal/",
no-port-forwarding,no-agent-forwarding,no-X11-
forwarding,no-pty ssh-rsa (...) replication@local
```

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Streaming replication in 9.0

- Uses libpq for connections
- User must be *superuser*
- «Fake» database *replication*
- So secure the same way as Slony

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Monitor!

- IDS
- «tcpdump |grep SELECT»
- Log connections/disconnections

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Audit!

- If you're not auditing pg_hba.conf today...
- Now is a good time to start!

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Questions?

magnus@hagander.net
Twitter: @magnushagander
http://blog.hagander.net