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Secure PostgreSQL Deployments

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There's much to security

- Identify the threats
- Apply the *correct* measures
  - Don't do things just because you can

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Not in this talk

- Application security
- Data Access Control
- Data Encryption
- etc
- etc

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Definitely not in this talk

- Unix vs Windows
- Linux vs BSD
- SELinux/SEPostgreSQL
- Any other religion

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In this talk!

- Authentication methods
- Connection security

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Authentication methods

- How do we determine who the user is
- *When* do we determine who the user is

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pg_hba.conf

- Lets you use different auth methods from different clients
- Not just limited to username/password
- For convenience or security
- Internal or external

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Trust Authentication

- Any user can be anyone he/she claims to be!

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Trust Authentication

- Any user can be anyone he/she claims to be!
- Anyone think this is a bad idea?

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Username/password

- Normally, use *md5* method
  - crypt has been removed, avoid plaintext
- What everybody does
- What everybody *expects*

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ident

- Local unix credentials
  - Very good!
- Default for most packaged versions
- *Never* use over the network

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LDAP authentication

- To the client, username/password
- Backend verification is off-loaded to directory server
- Common in enterprise deployments
- Password policies, expiry, etc

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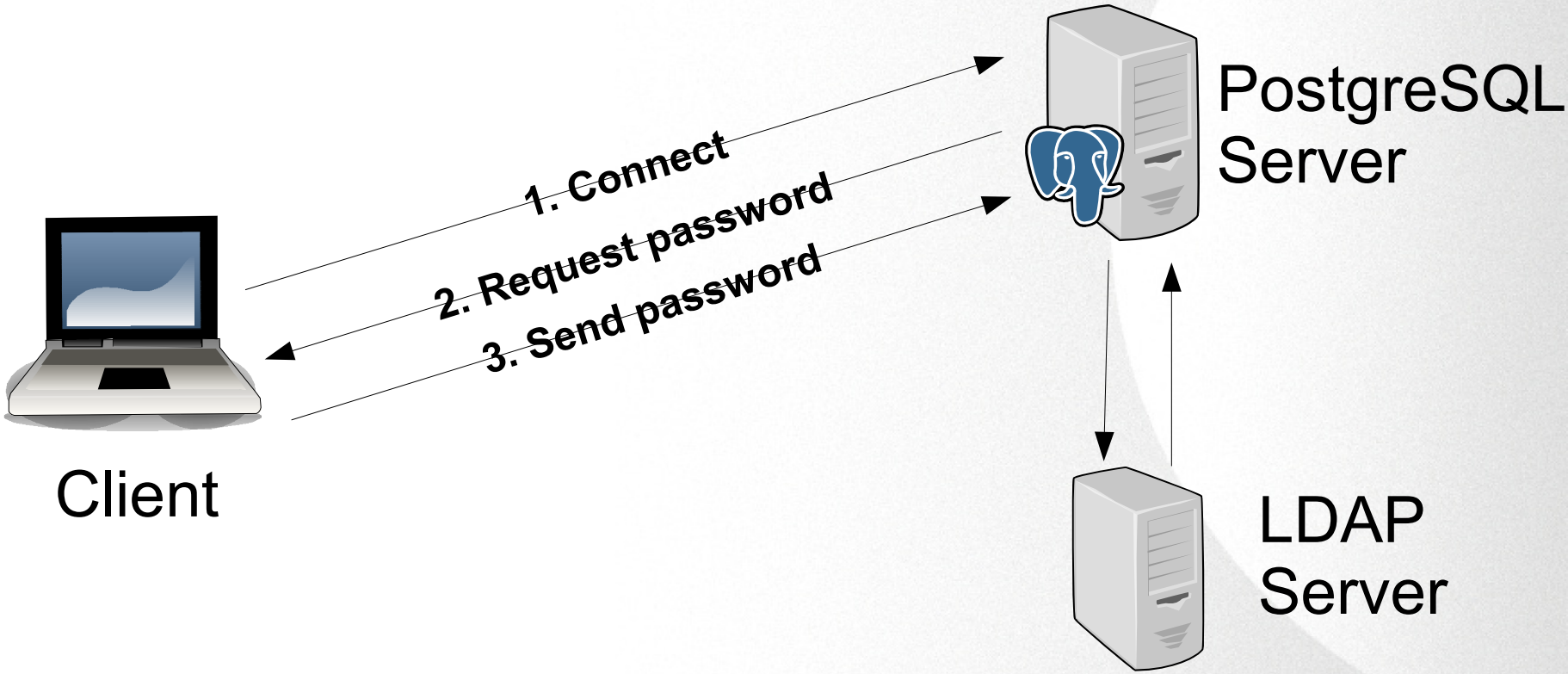
LDAP authentication

- Single *password* not single *signon*



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Kerberos/GSSAPI/SSPI

- Single *signon*
- Same benefits as LDAP (mostly)
- Most common: Active Directory

- («krb5» is deprecated)

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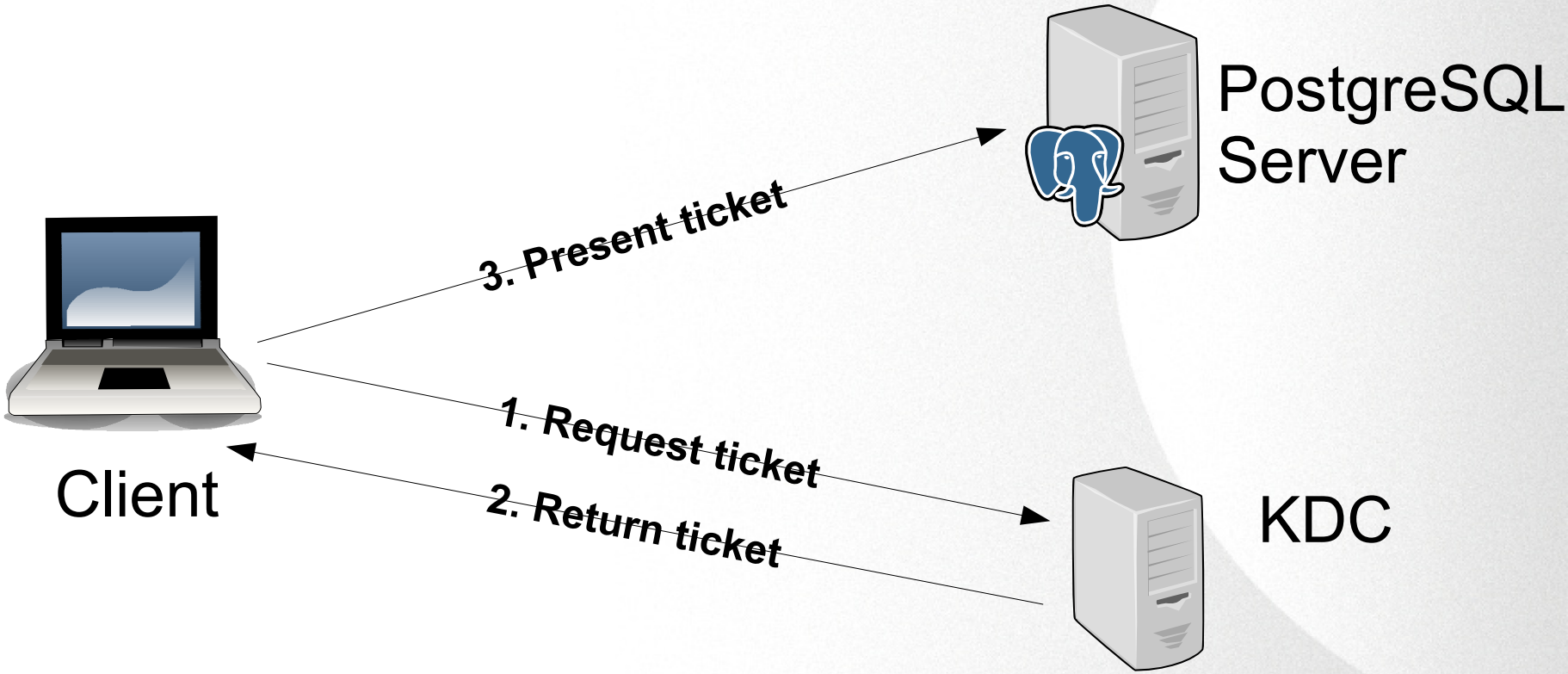
Kerberos/GSSAPI/SSPI



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PAM

- Provided by OS
- Can do password, LDAP, etc
- Can also do Kerberos & friends
- One-time passwords
  - RSA SecurID, Vasco, etc
  - RADIUS

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SSL

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SSL secured connections

- Encryption
- Man-in-the-middle protection
- Authentication

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SSL secured connections

- Enabled on the server (ssl=yes)
  - Platform quirks!
- Optionally required through pg_hba
- Optionally required in libpq

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SSL secured connections

- Need to protect data in *both* directions
- For example username/password
- Must *know* before connection is started
  - Unknown equals unprotected

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SSL encryption

- SSL *always* requires a server certificate
- Can be self-signed
- Does not need to be known by client

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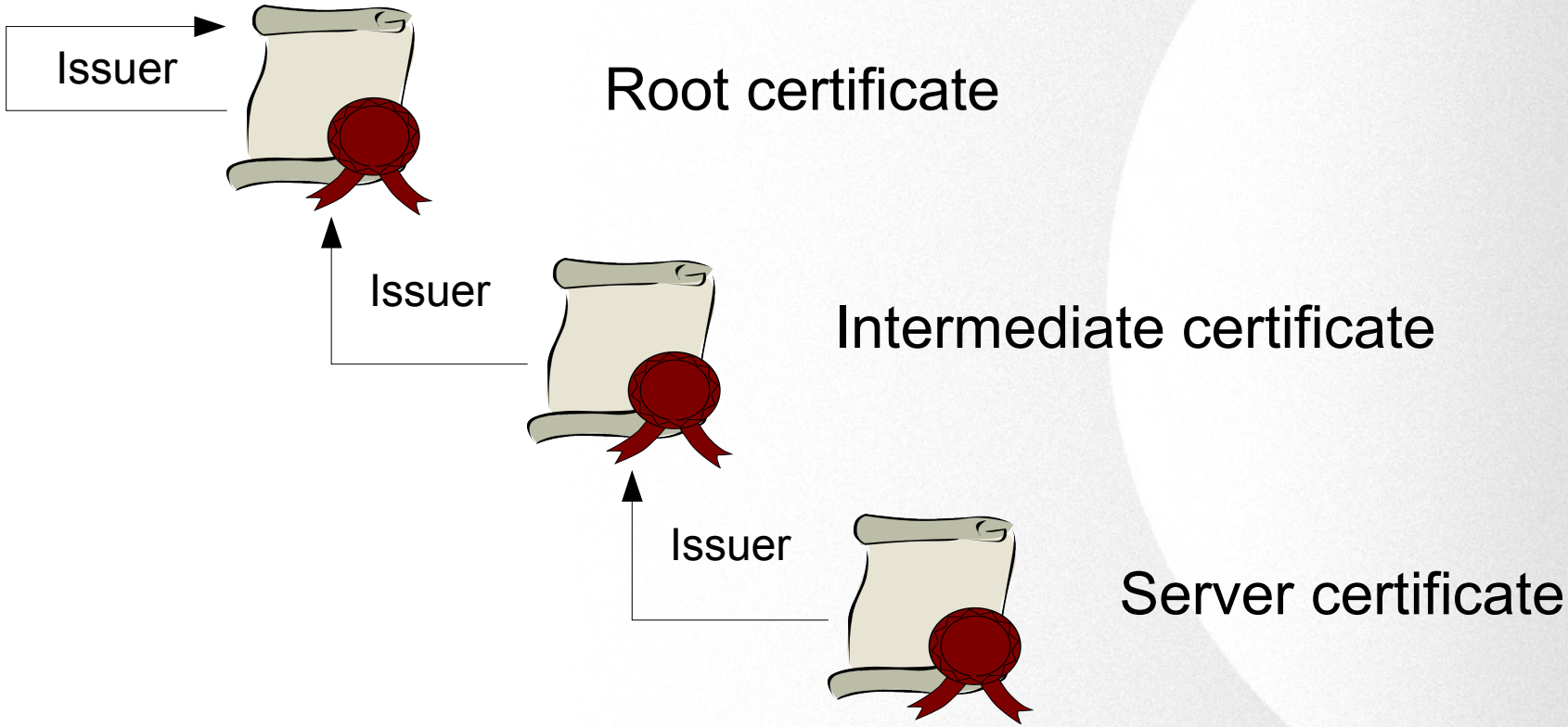
Certificate chains



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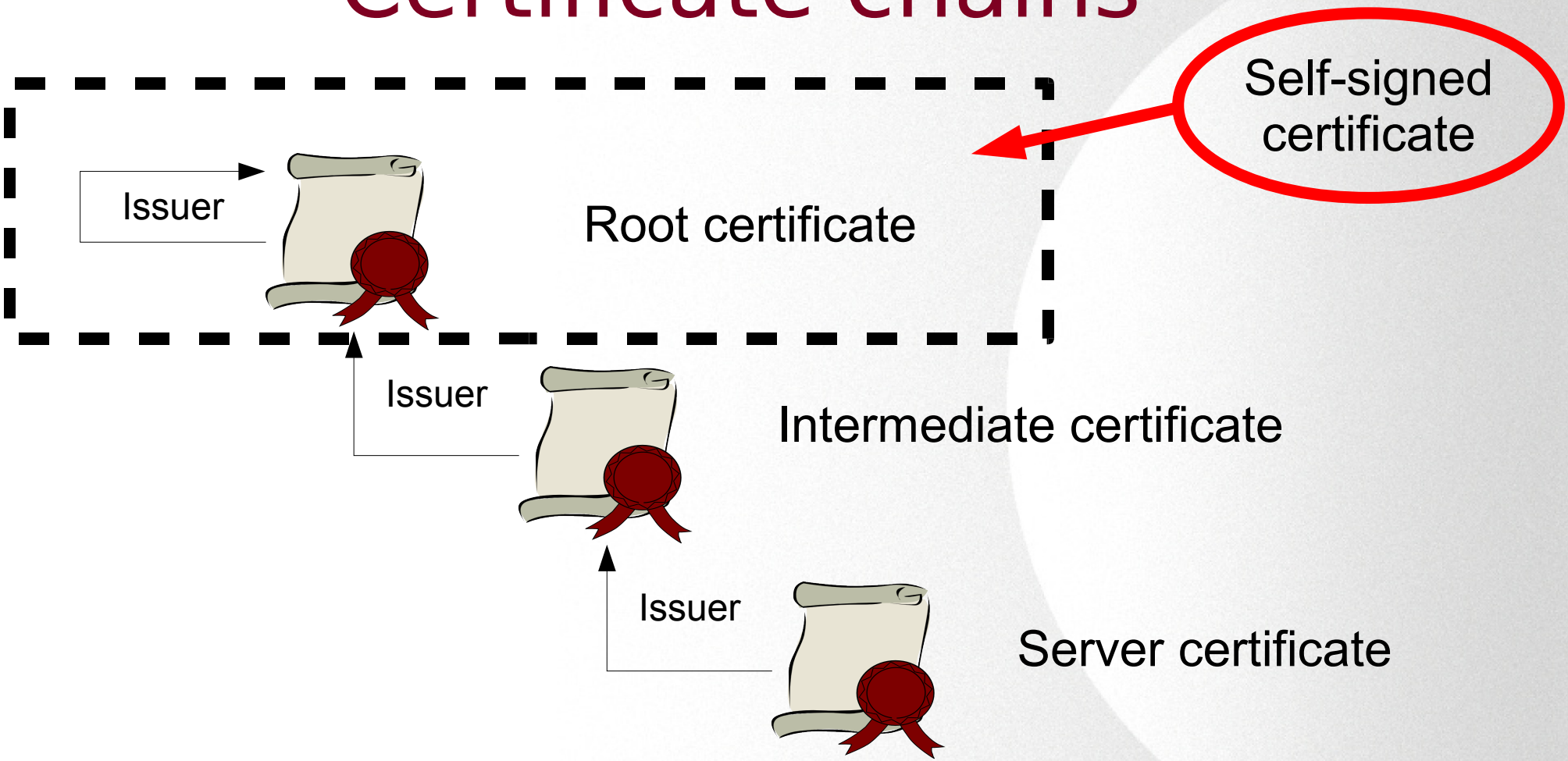
Certificate chains



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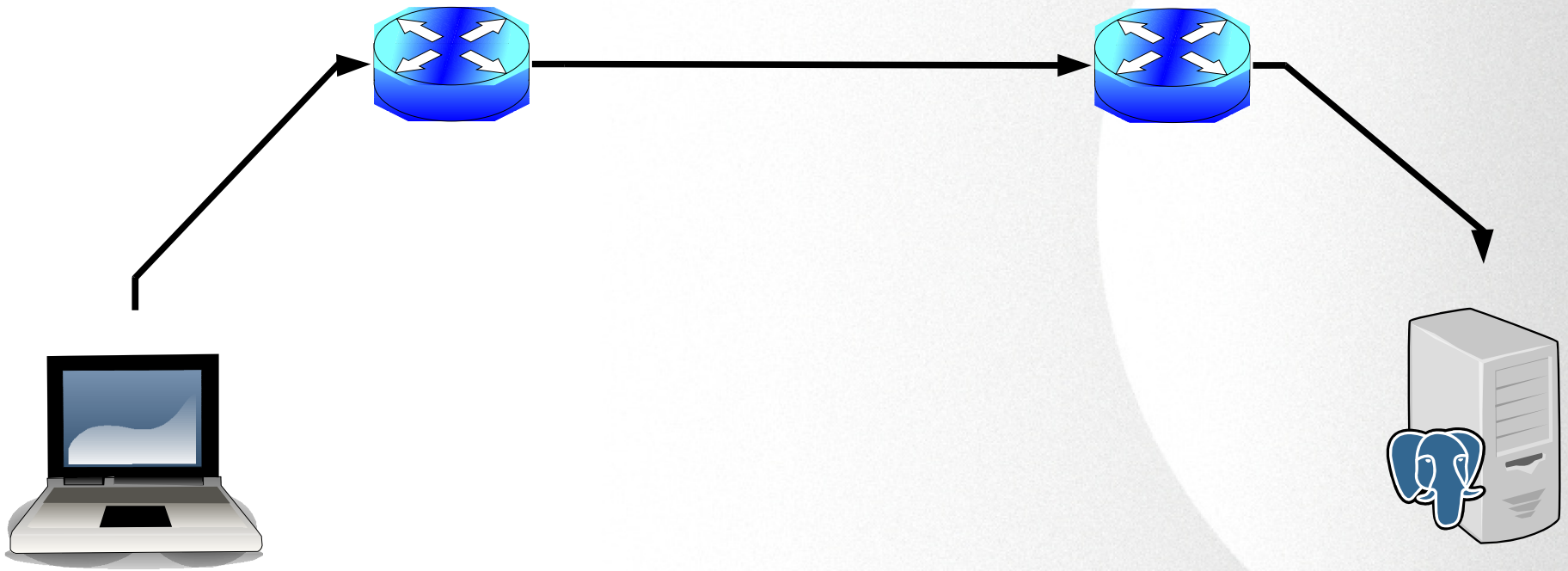
SSL secured connections



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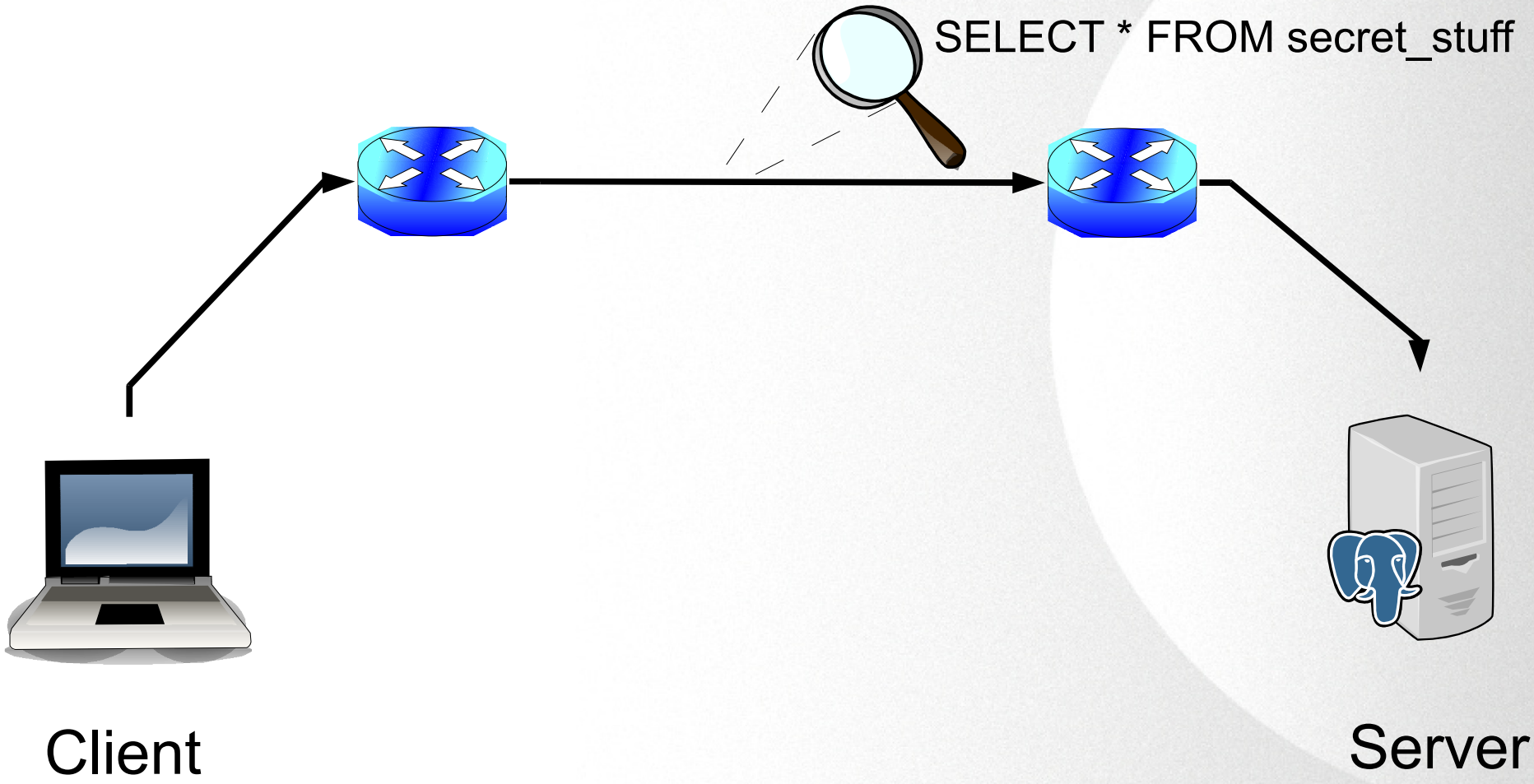
Threats handled by SSL: Eavesdropping



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Eavesdropping

- Prevented by encrypting all data
- Key negotiation is automatic
  - On initial connection
  - After 512Mb traffic
- Server certificate used but not verified

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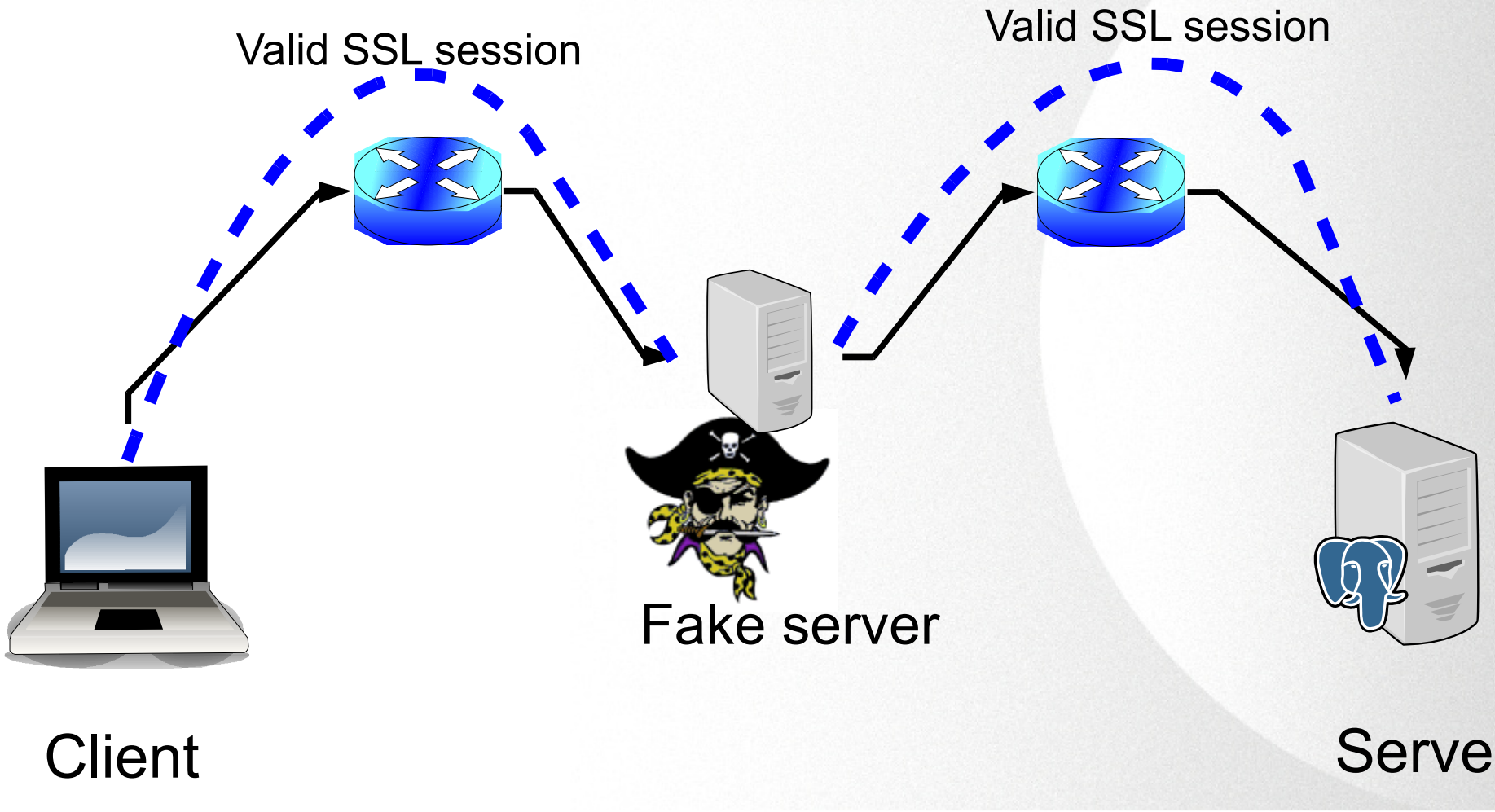
Threats handled by SSL: Man in the middle



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SSL server verification

- On top of encryption
- Validate that the server is who it claims to be
- CA issues certificate, can be self-signed
- CA certificate known by client

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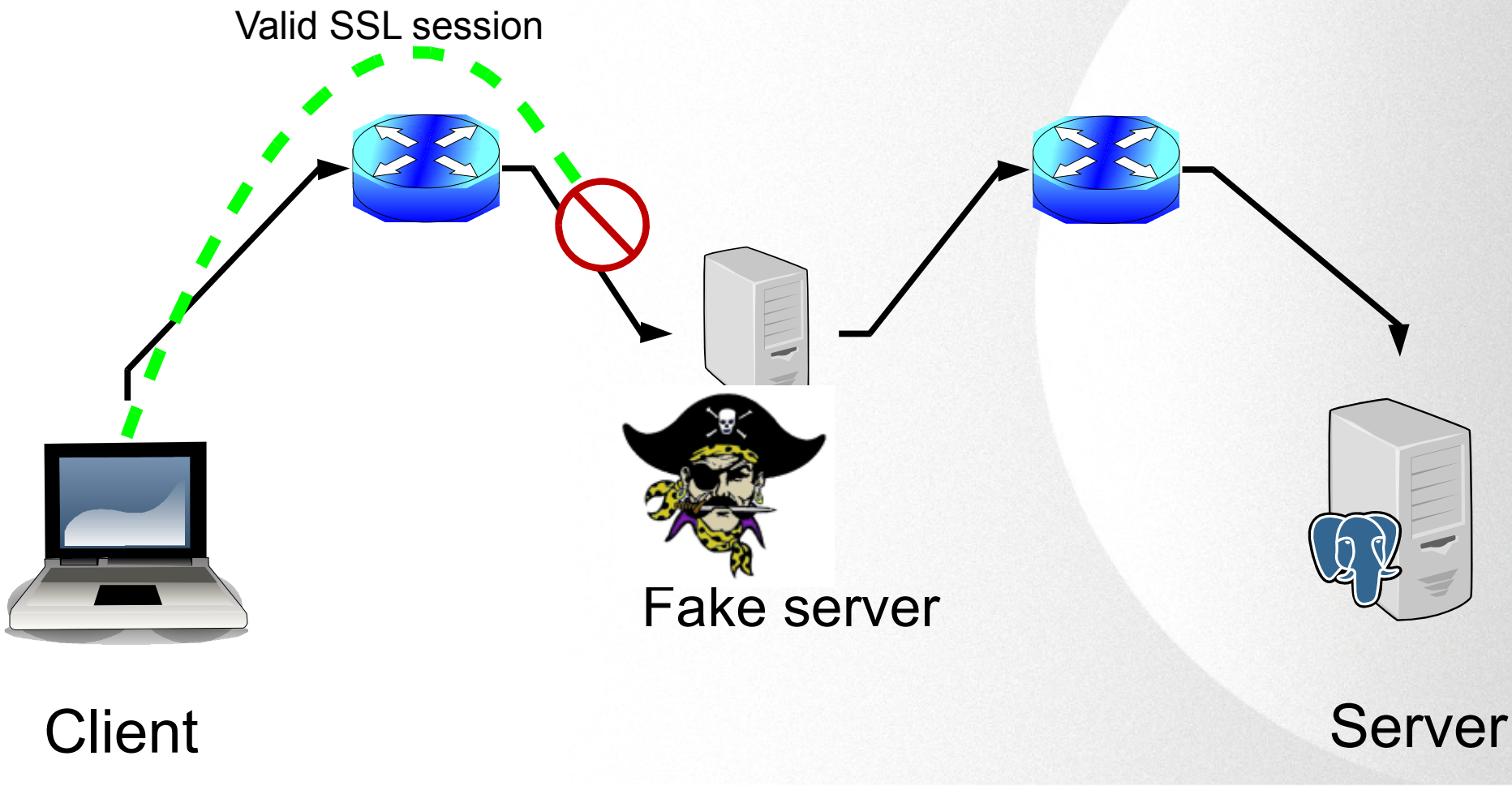
Threats handled by SSL: Man in the middle



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SSL client authentication

- On top of encryption
- Normally on top of server verificateion, but not necessary
- CA issued certificate on *client*
- Match *CN* on certificate to user id
- Protect client certificate!

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SSL client authentication

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SSL in libpq

- Controlled by *sslmode* parameter
- Or environment *PGSSLMODE*
- For security, must be set on client
  - Remember, *unknown = unsecure*

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Summary of libpq SSL modes

	Protect against		Compatible with server set to...		Performance
Client Mode	**Eavesdrop**	**MITM**	**SSL required**	**SSL disabled**	**overhead**
disable	no	no	FAIL	works	no
allow	no	no	works	works	If necessary
prefer	no	no	works	works	If possible
require	yes	no	works	FAIL	yes
verify-ca	yes	yes	works	FAIL	yes
verify-full	yes	yes	works	FAIL	yes

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Not a bad idea: ipsec

- If already deployed
- Application transparent
- Global policies
- Integrated management
- Somebody Elses Problem?

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Questions?

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