Using Kerberos for Web Authentication

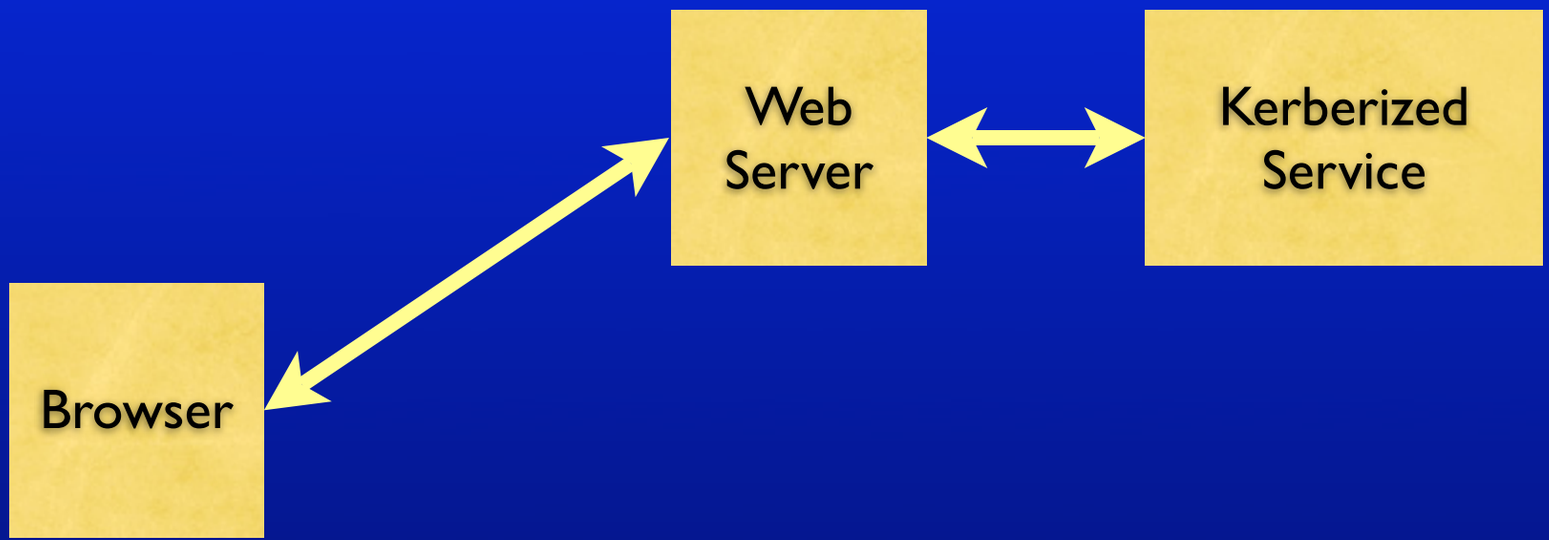
Wesley Craig
University of Michigan

Outline

- Basic Auth
- WebSSO
- SASL & HTTP
- Kerberos & TLS
- SPNEGO
- PKI, PKI, PKI

For each technology, a brief over view, drawbacks, and benefits. All informed by our work for University of Michigan on CoSign.

Proxy Authentication

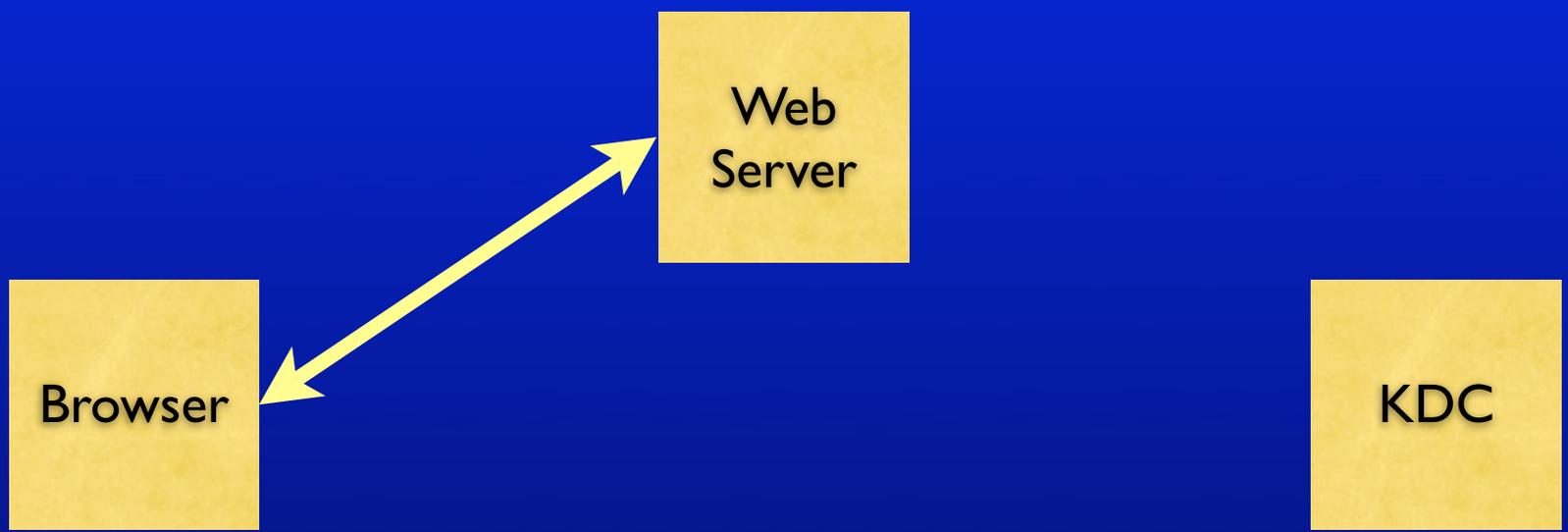


Three sorts of proxy: web server enforces authZ; web server uses, e.g. SASL, to authN as itself authZ as user, application enforces authZ; web server authN as user for applications that don't support split authN/Z, e.g., AFS.

Basic Auth

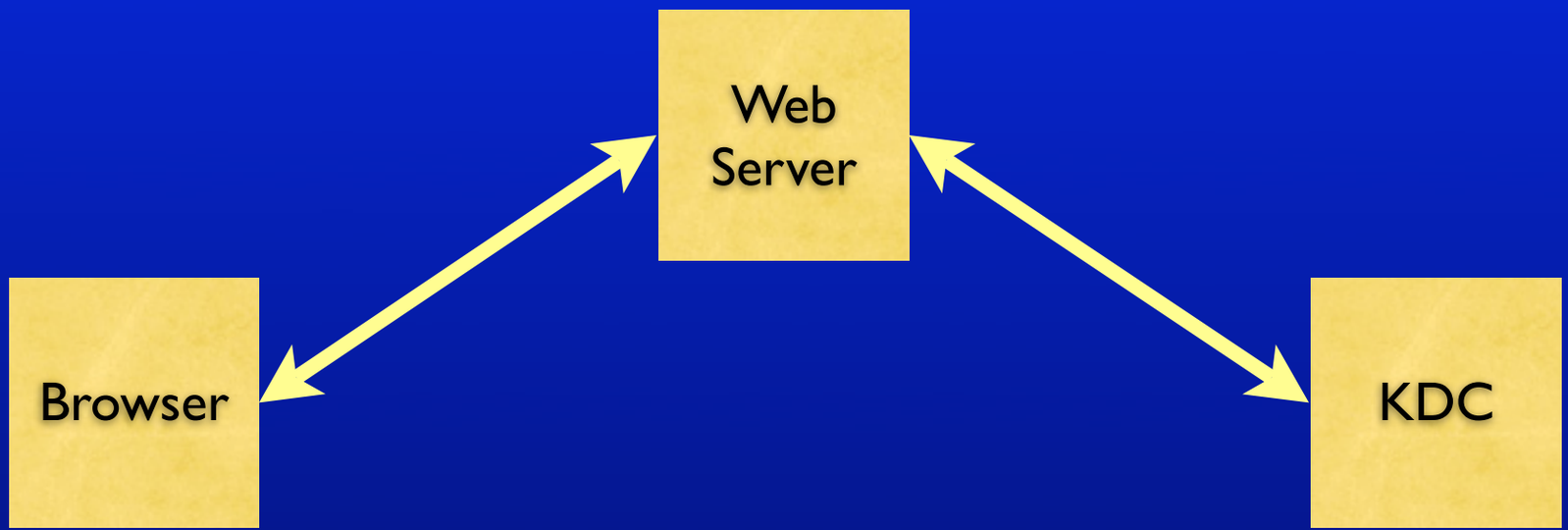
- Defined in RFC 2617
- Most browsers & web servers implement it

mod_auth_kerb Basic



Browser: GET
Server: 401
WWW-Authenticate: Basic realm="some text"
Browser GET
Authorization: Basic base64(user:password)

mod_auth_kerb Basic



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Browser GET
Authorization: Basic base64(user:password)

Basic Auth Risks

- User gives password to every web server

  Breaks single sign-on

  Trains users to freely give their password

  Is the server secure?
- Every web server needs SSL (or not)
- Every web server needs a keytab (or not)

Should I be sending my password to this server? Has this server been compromised?

Basic Auth Benefits

- Widely supported & well understood
- Works with WebDAV

WebSSO

- Typically "Form & Cookie"
- Typically only single sign-on for web services
- Examples: CoSign, WebAuth, CAS, etc.

Typically, because WebSSO's can also leverage "true" SSO

CoSign Design

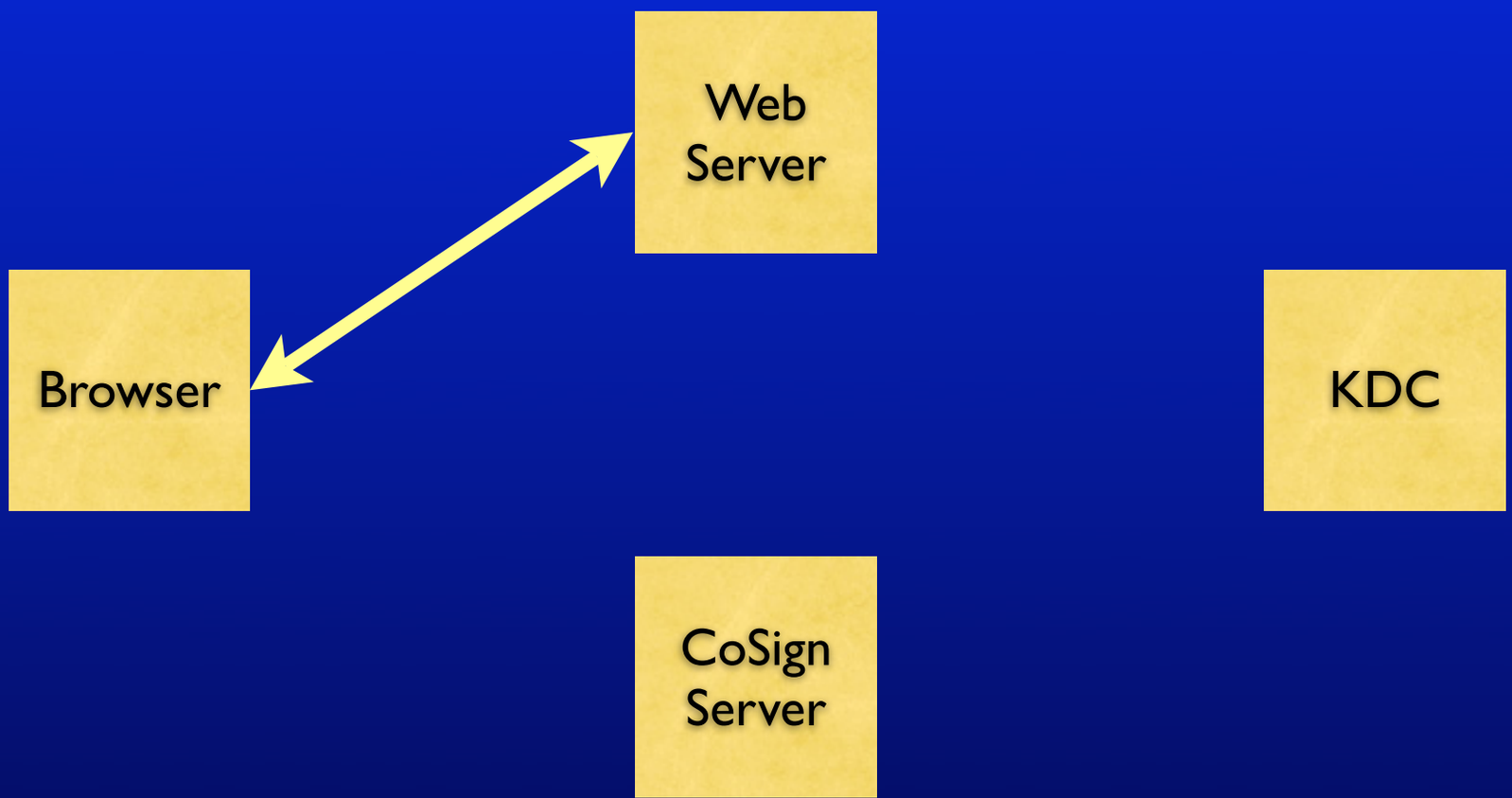
- Compartmentalized Security
- Kerberos V
- Proxy Kerberos Tickets

  http://filedrawers.org
- High Availability
- Global Logout

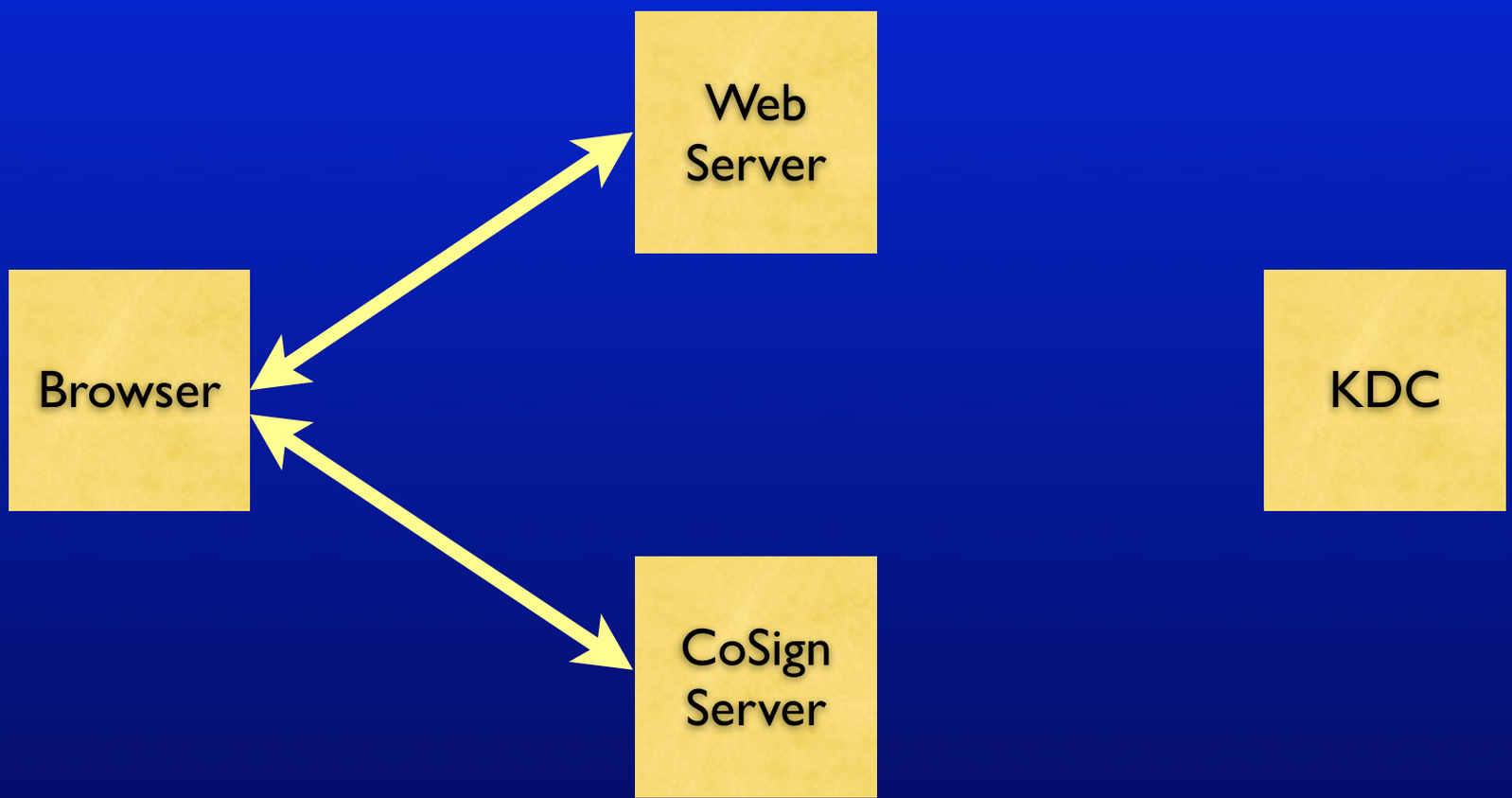
CoSign Extensions

- Centralized Guest Accounts
- Proxy CoSign Cookies
- Re-Authentication
- Multi-Factor
- Apache Authentication Modules
- X.509

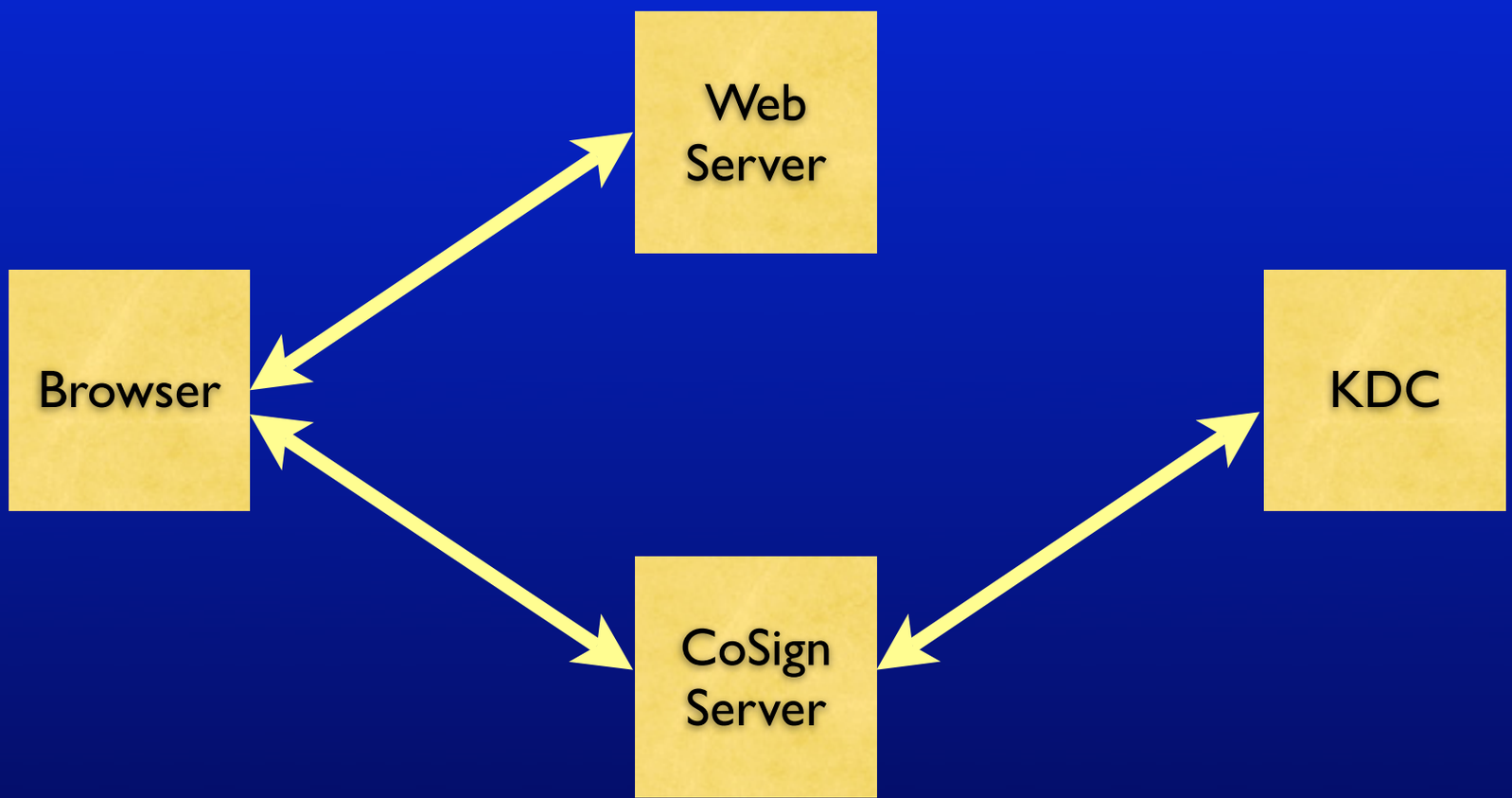
CoSign



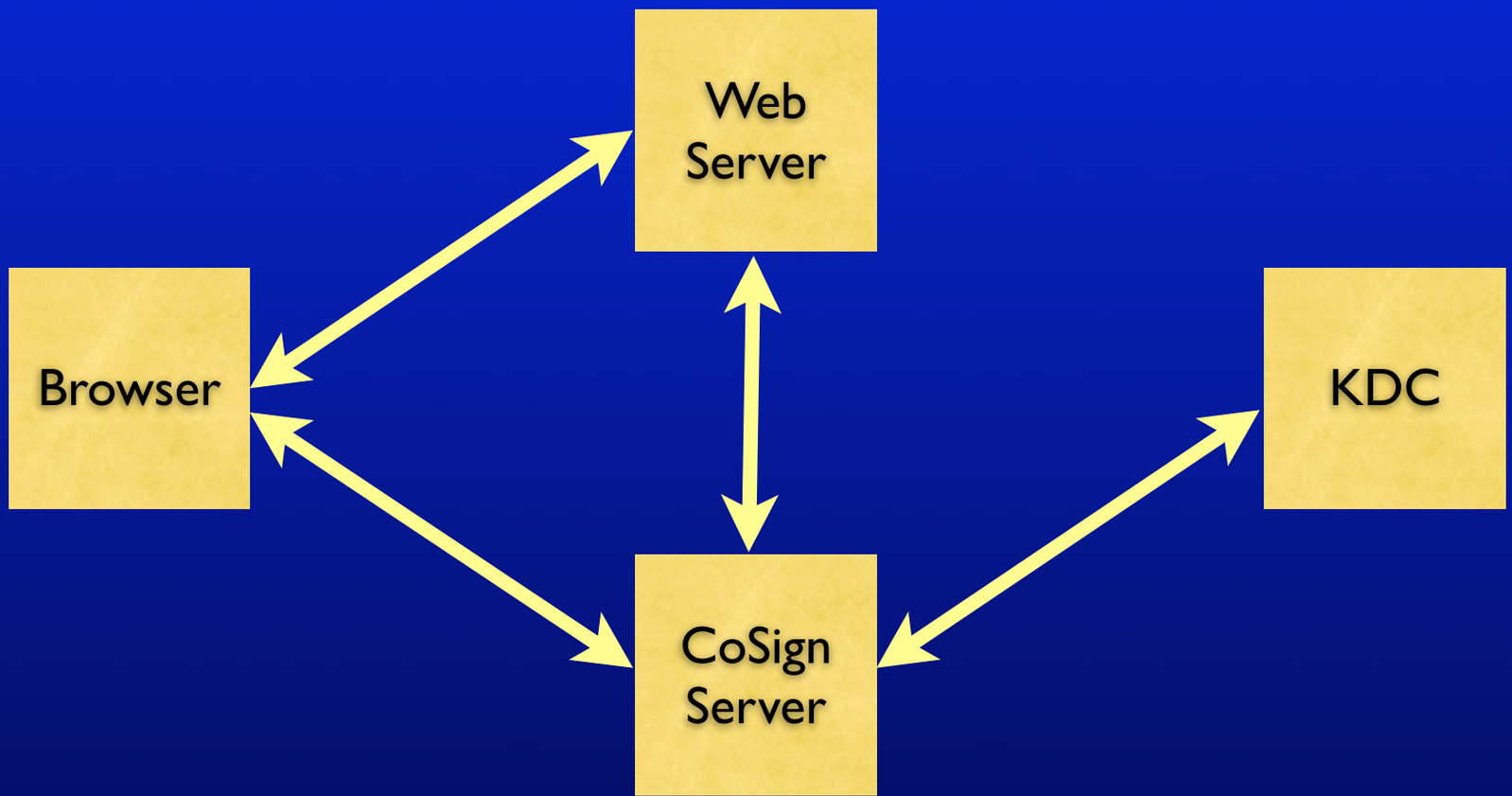
CoSign



CoSign



CoSign



CoSign Risks

- Requires cookies, which can be stolen
- May use passwords, which can be stolen

CoSign Benefits

- Broad browser support
- Can leverage: Basic Auth, SPNEGO, Shib, PKI, other WebSSOs, etc.
- Simple for users to understand
- Simple for CoSign-protected services

Kerberos over HTTP

- Kerberos over TLS (aka SSL)

  RFC 2712

  lynx, curl, stunnel

- SASL over HTTP

  draft-nystrom-http-sasl-12.txt (expired)

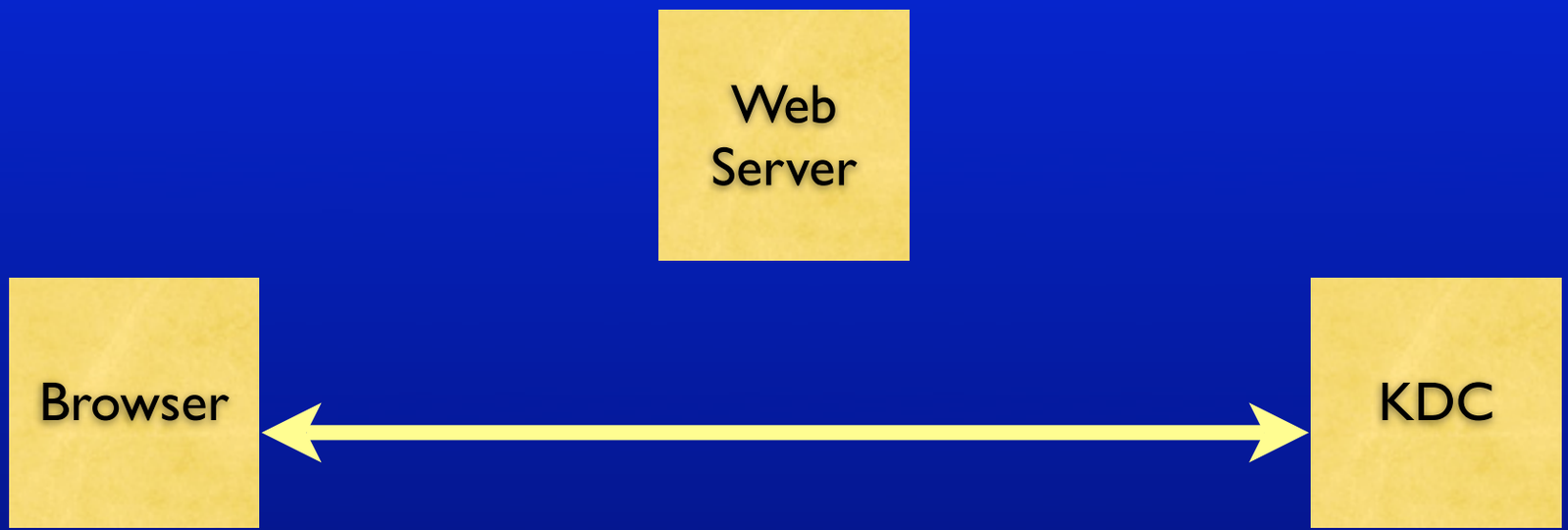
No support for graphical browsers.

SPNEGO

- Defined in RFC 4178
- **S**imple and **P**rotected Generic Security Service Application Program Interface **Nego**tiation Mechanism

HTTP Negotiate: draft-brezak-spnego-http-05.txt
HTTP Negotiate: draft-jaganathan-kerberos-http-01.txt (expired in January)

mod_auth_kerb SPNEGO



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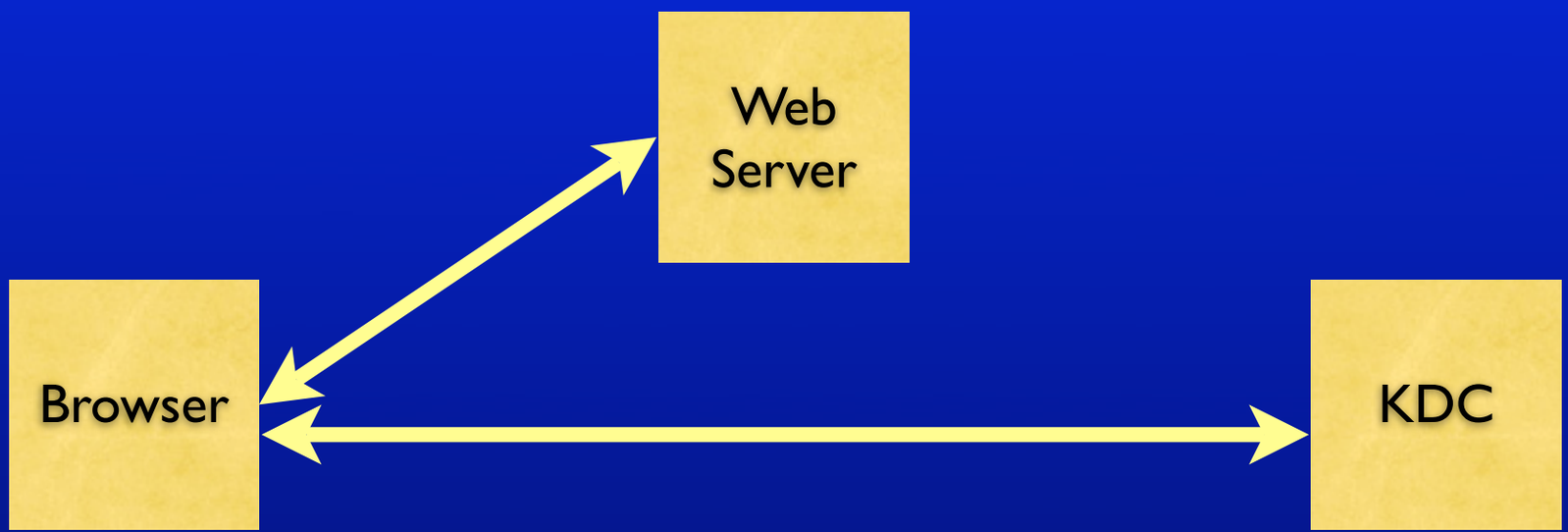


SPNEGO Risks

- Limited browser support and/or complex configuration
- Web server support
- Kerberos client support

Browsers don't necessarily behave as expected or in a friendly way. Some don't support delegation. Supporting "Kerberos" might mean supporting AD on some platforms.

SPNEGO Benefits

- True SSO
- “Delegation” works for tiered/proxied services
- Active community

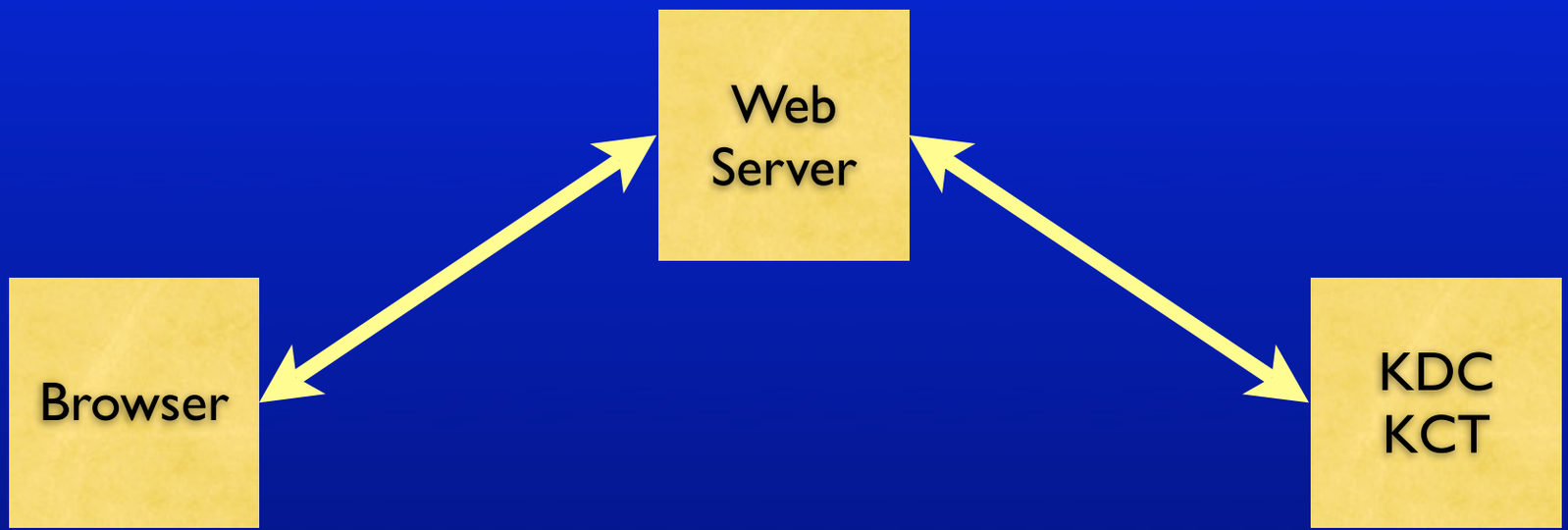
SSL Client Authentication

- Distribute X.509 client certificates to users
- What about Kerberos?

PKI - client certificates

Web server sends transcript of SSL handshake to credential translator and gets back kerberos credentials.

PKI - client certificates



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PKI - pkinit & SPNEGO

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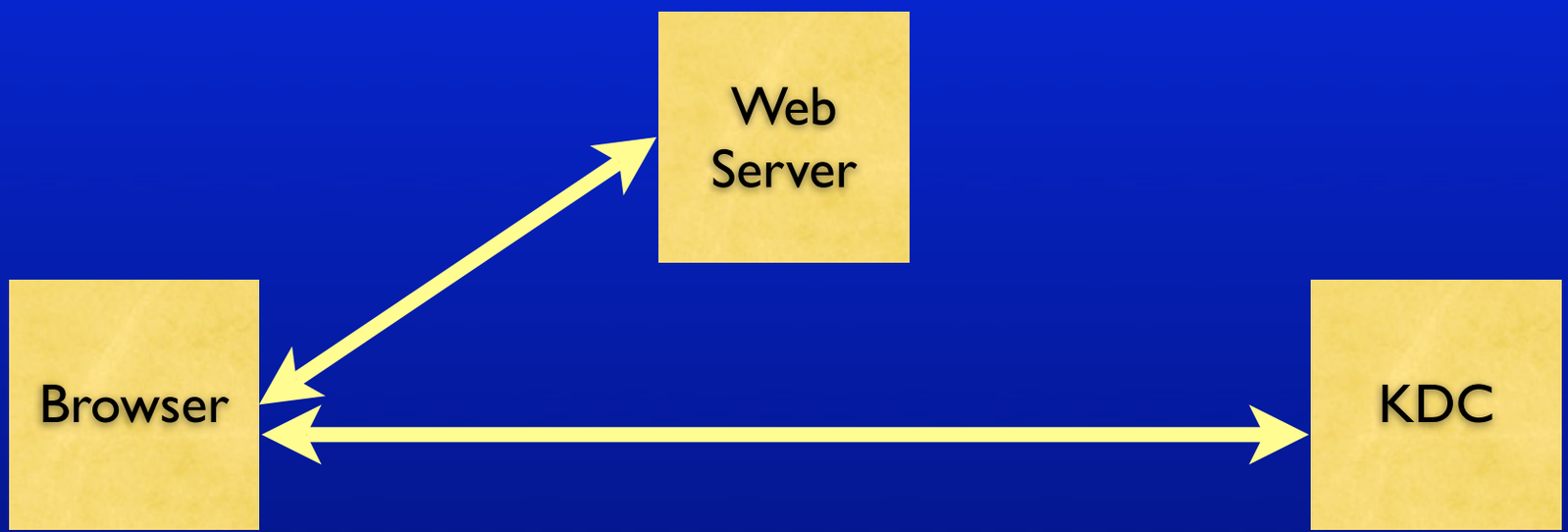
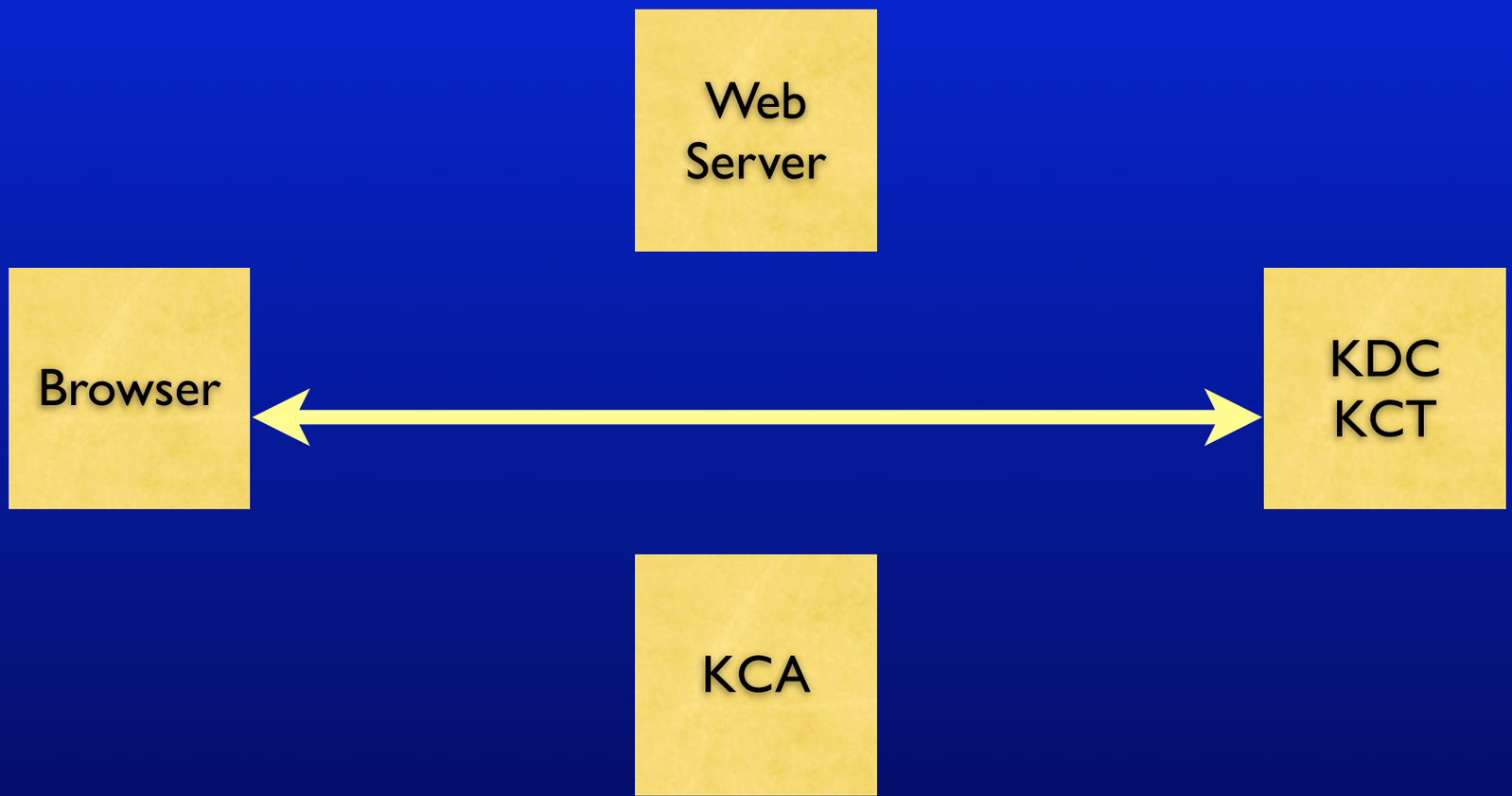


PKI - junk certificates



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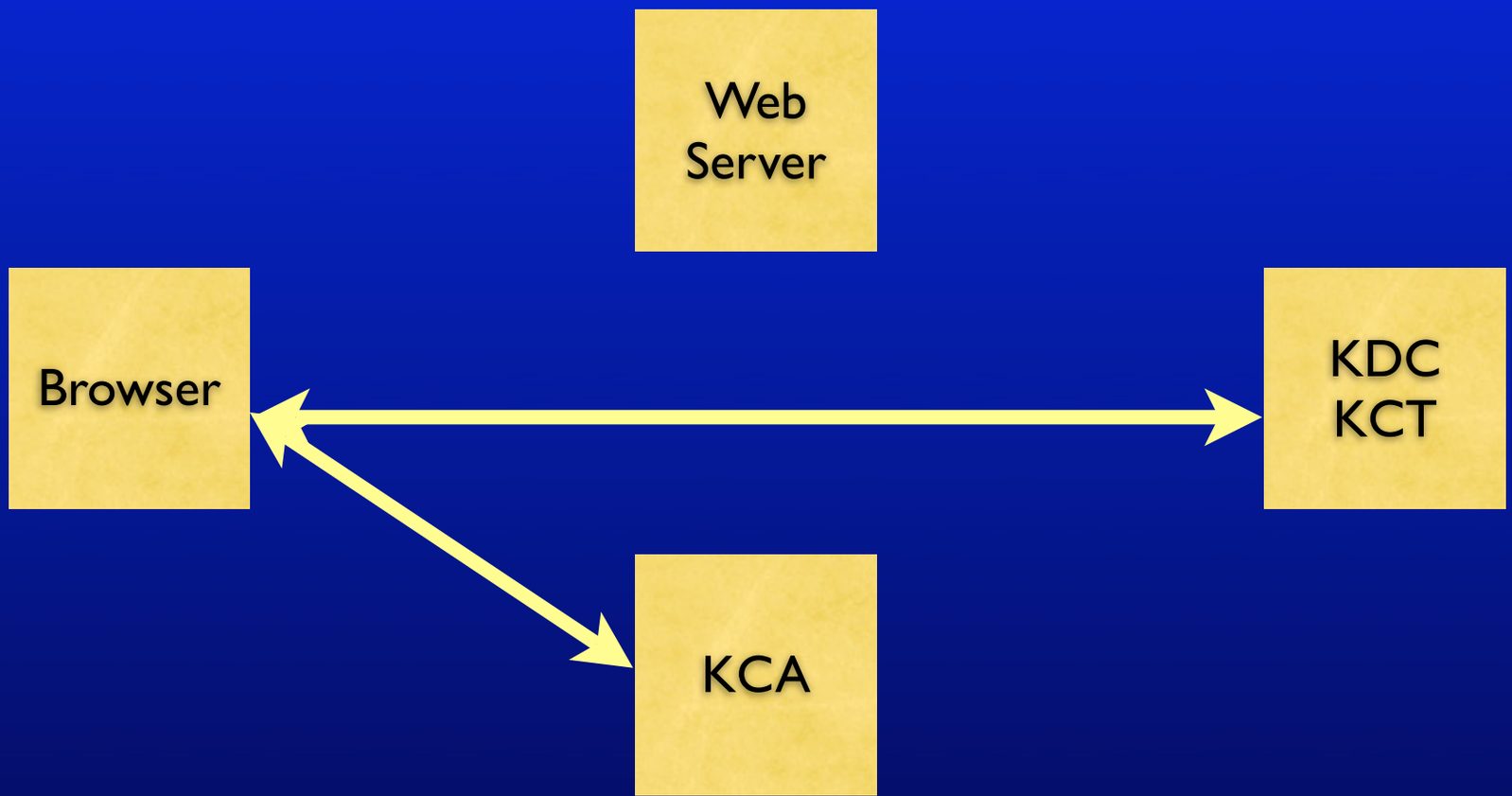

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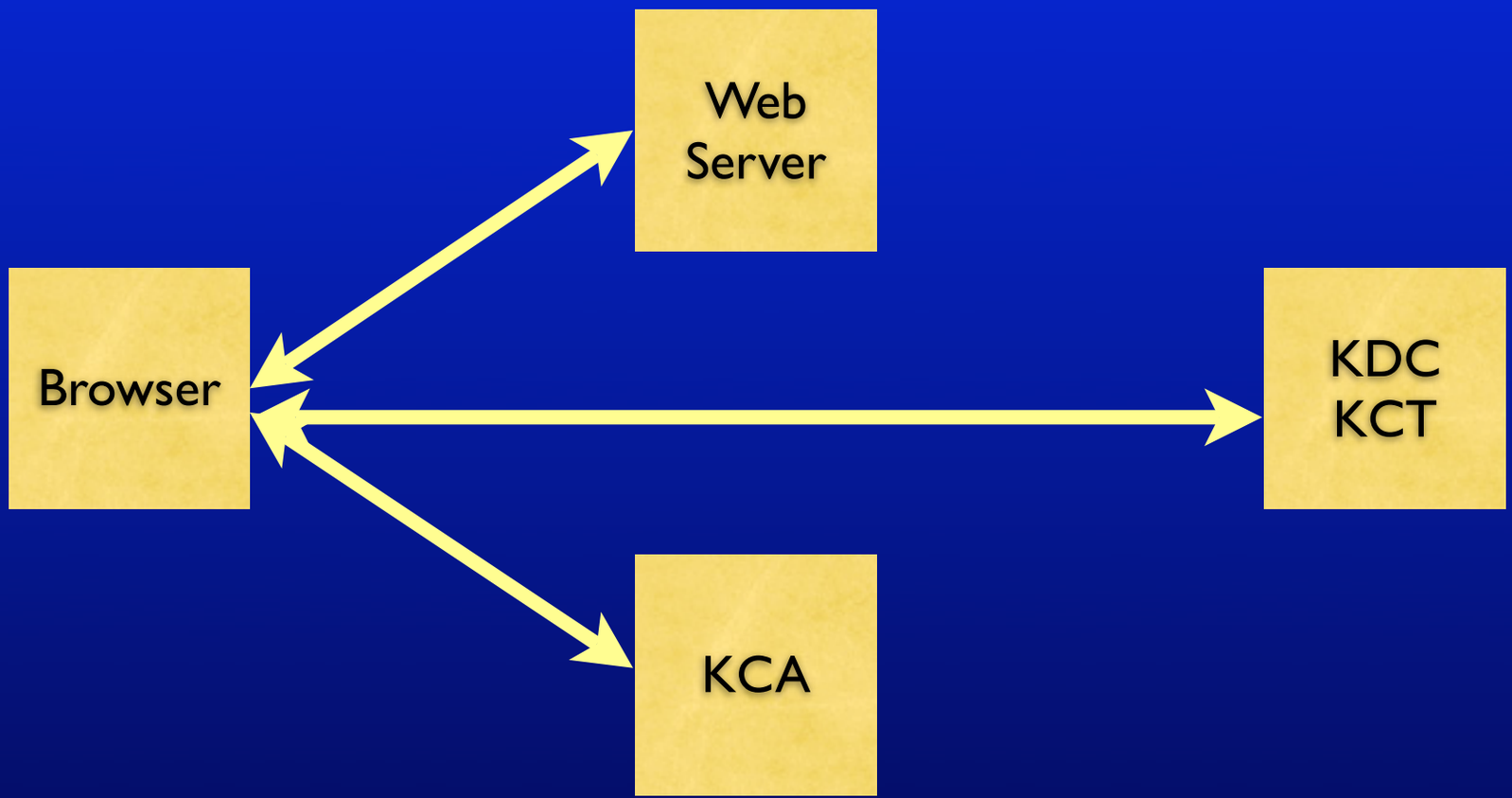

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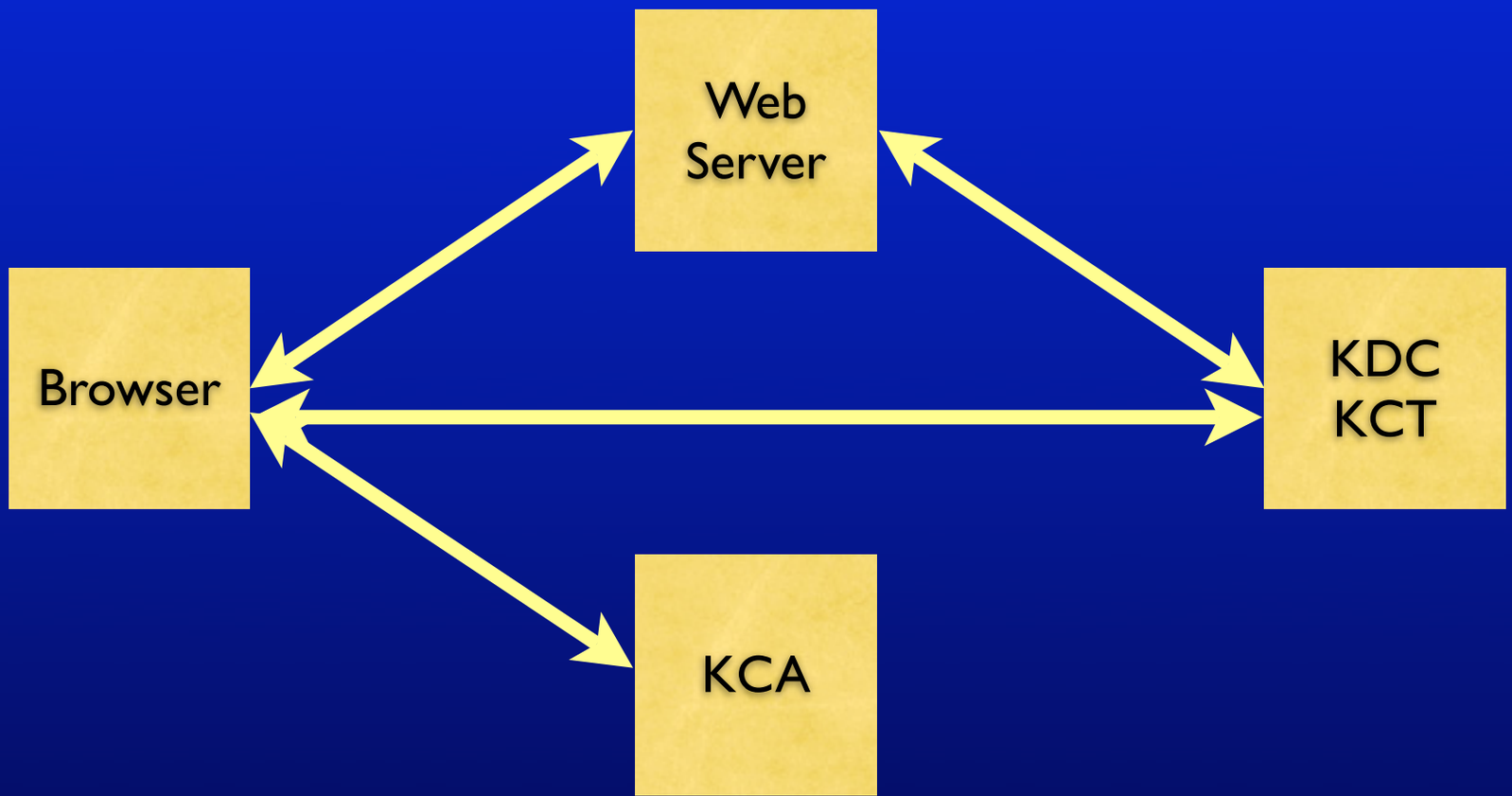

SSL Client Authentication Risks

- Need either PKI or client software
- Hard for users to understand
- Certificates can be stolen
- More complex solutions inherit all the problems of their underlying components
- Not widely adopted

SSL Client Authentication Benefits

- True SSO
- PKI is useful outside of browsers
- PKI is useful beyond authentication

University of Michigan

- Deploy Multi-Factor AuthN in CoSign
- Deploy Client Certificates in CoSign
- Deploy SPNEGO in CoSign
- Deploy WebDAV with Basic Auth

Q & A

http://weblogin.org

cosign@umich.edu

wes@umich.edu