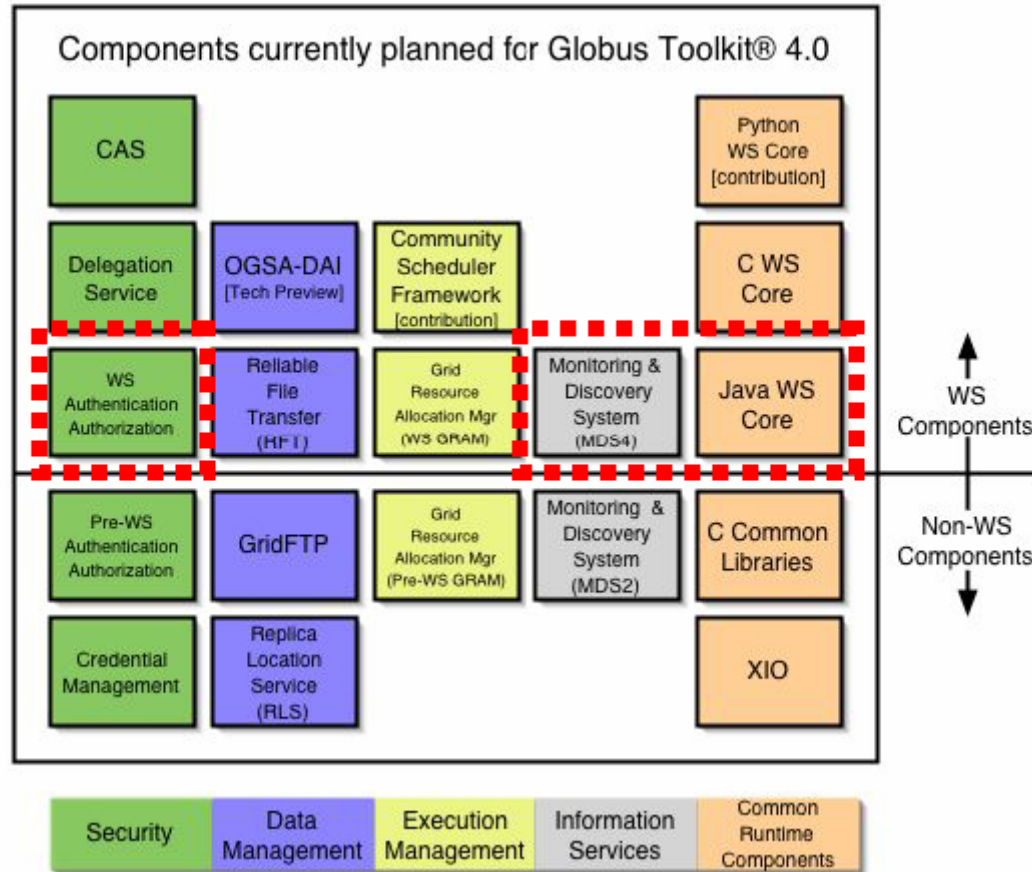


Useful grid services

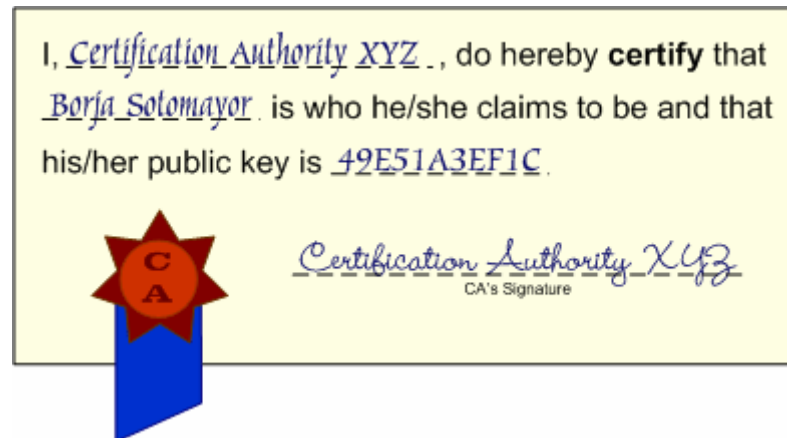
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- **Grid security infrastructure (GSI)**
 - Authentication and authorization framework
- **GridFTP**
 - File transfer
- **MDS4**
 - Monitoring and discovery

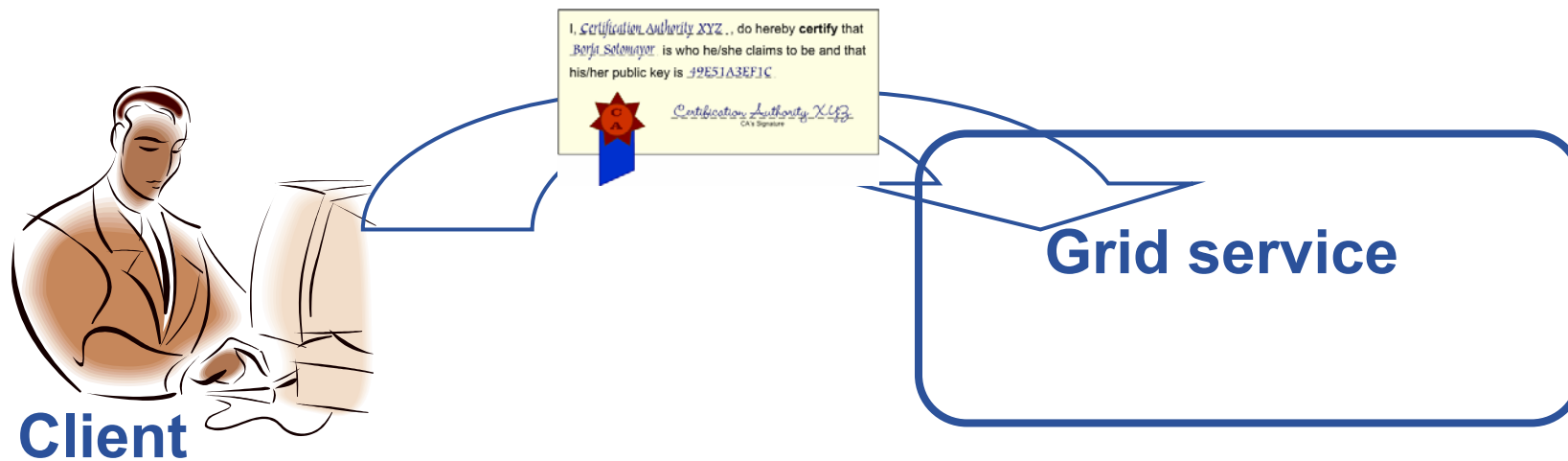


- **Service provider must be protected from unauthorized access**
- **Authentication: who is the user?**
- **Authorization: Is he permitted to do it ?**

- A *digital certificate* is a digital document that *certifies* that a certain public key is owned by a particular user. This document is signed by a third party called the *certificate authority (or CA)*.

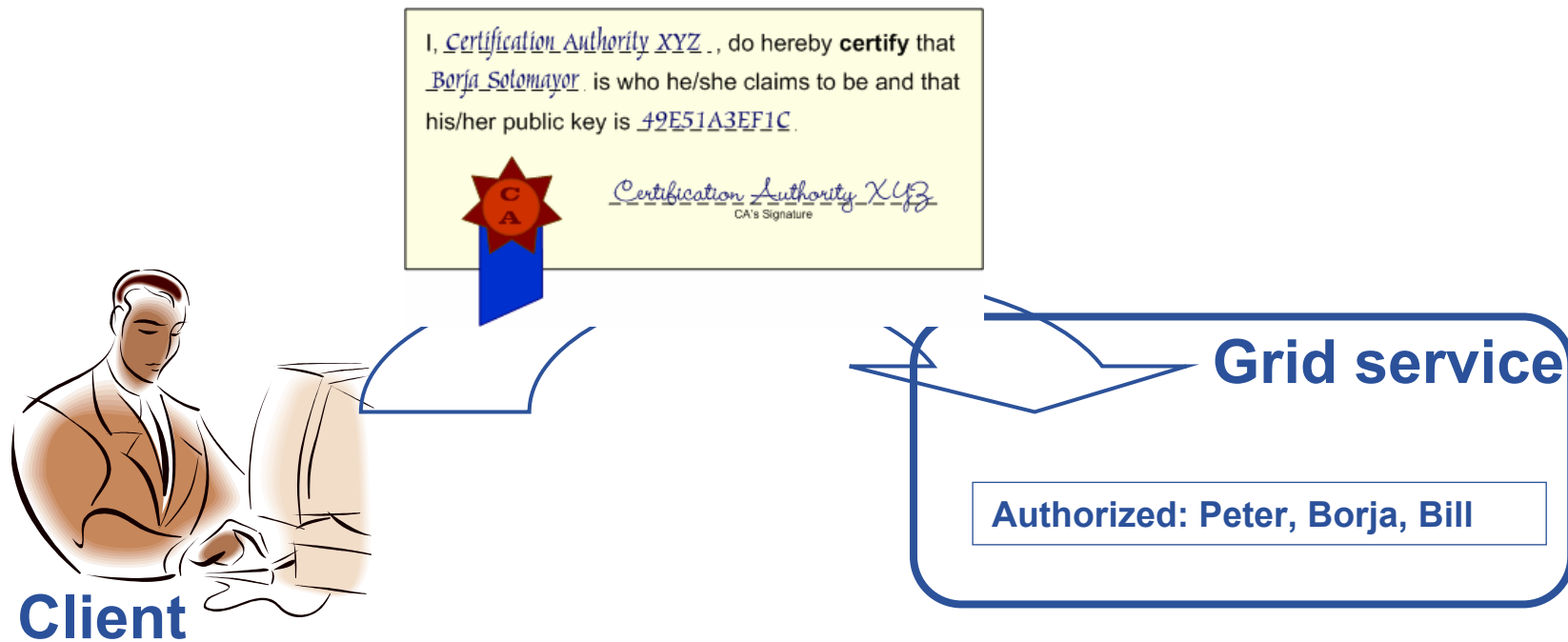


- When users want to access a grid service, they send their certificates (more accurately, proxy certificate) to the service
- The service can check the sign and prove that the users are who they claim to be



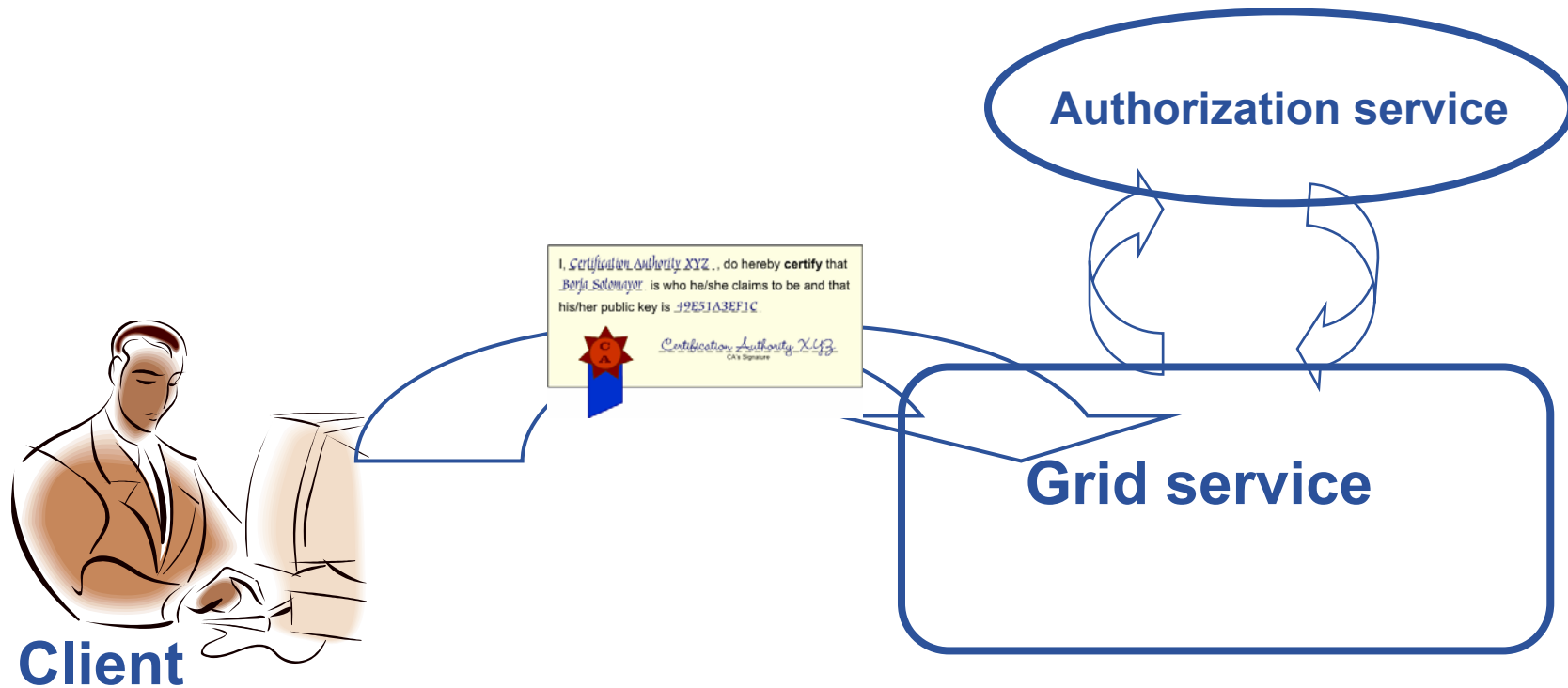
- **Certificates only prove that who are the users (authentication)**
- **Authorization methods**
 - Gridmap
 - Authorization service

- A list of authorized persons
- Can be configured for each service individually

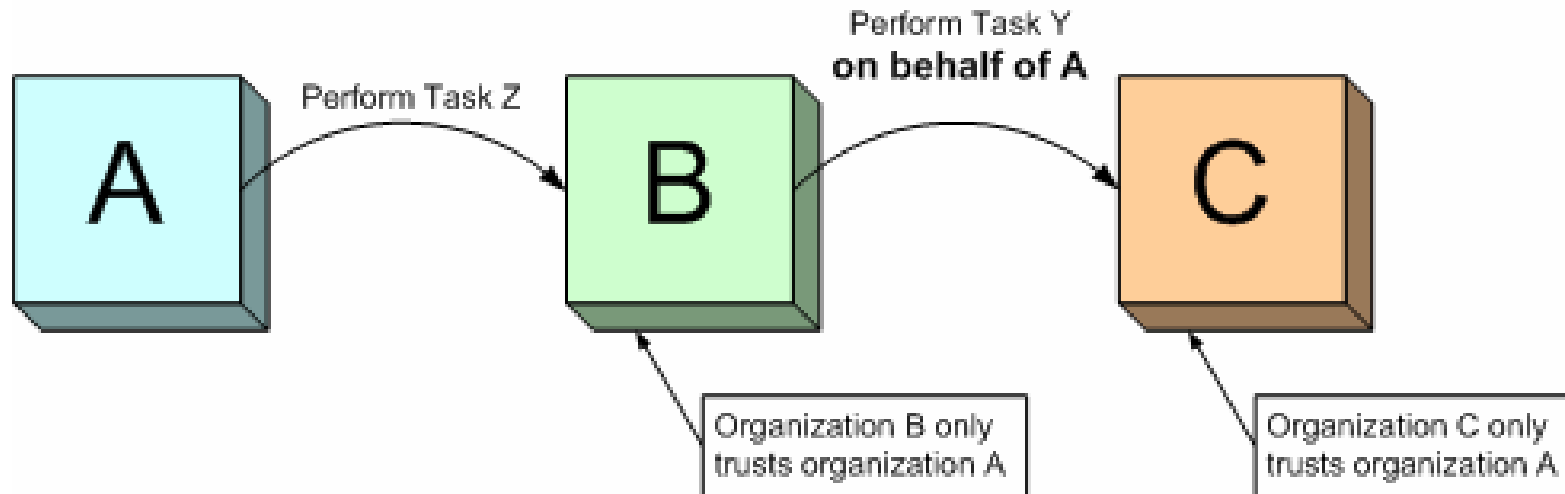


- **Advantage: simplicity, easy to use**
- **Disadvantage: difficult to manage for large numbers of services/users**

- The service contacts to central authorization service to ask if the user can perform the action



- The certificates can be used to delegate some tasks to do in behalf of the users
- Once users have valid proxy certificates, they can use them to access all services (single sign-on)



- **Authentication and authorization mechanism are automatically integrated into grid services**
 - Simply turn on/off security options

- **Besides certificates, other authentication/authorization methods are also supported (username/password, Kerberos)**

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- File transfer protocol supported grid authentication and authorization mechanism
- Use: from command-line or in scripts

`globus-url-copy` **fromURL toURL**

Example:

```
>globbus-url-copy
```

```
gsiftp://cluster.ui.sav.sk/home/viet/sourcefile
```

```
file:///tmp/destfile
```

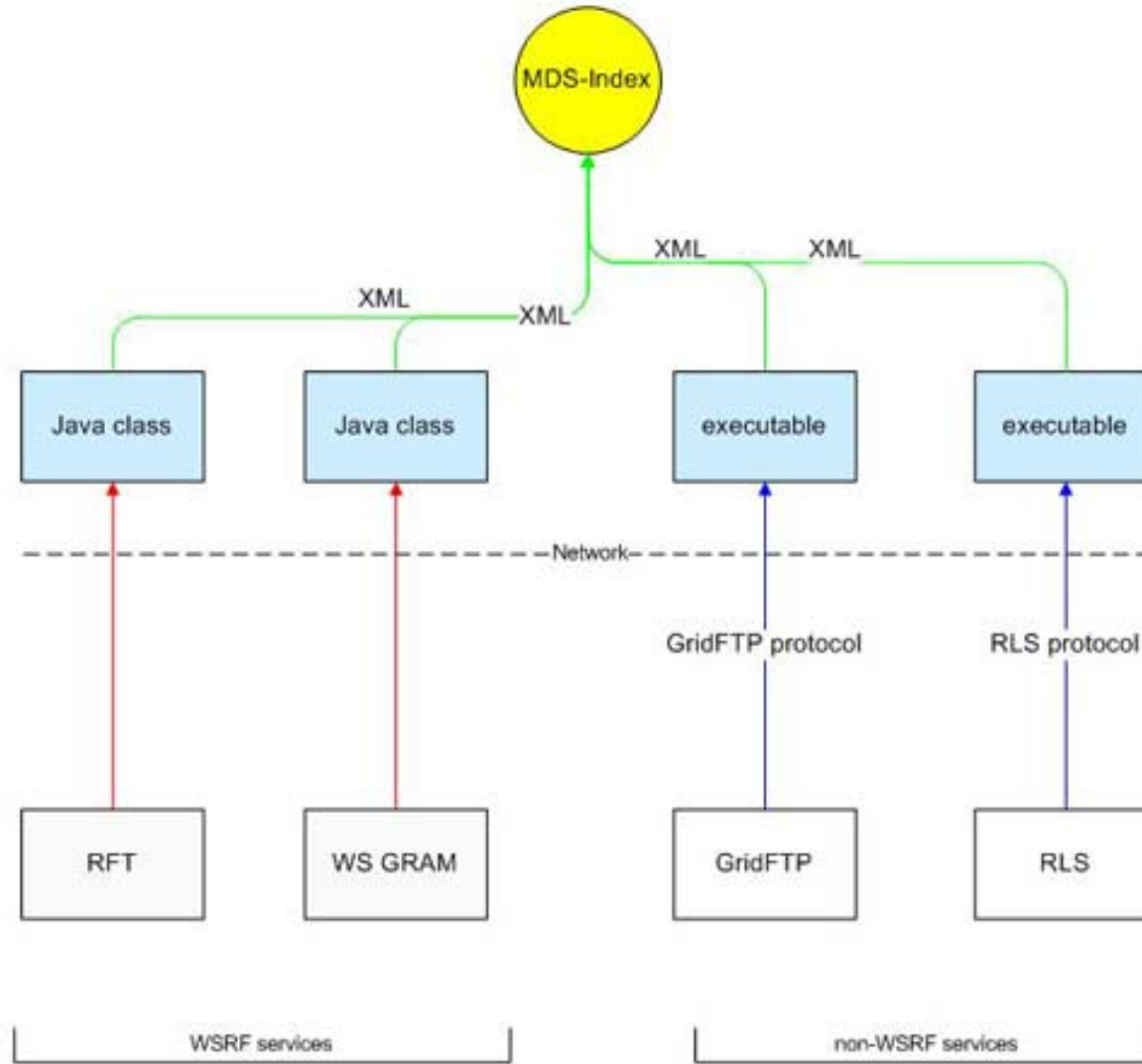
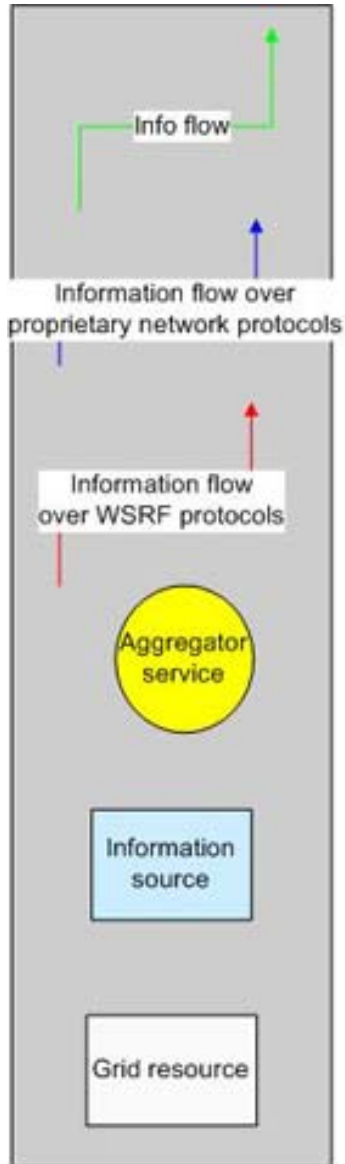
- Use: in Java code

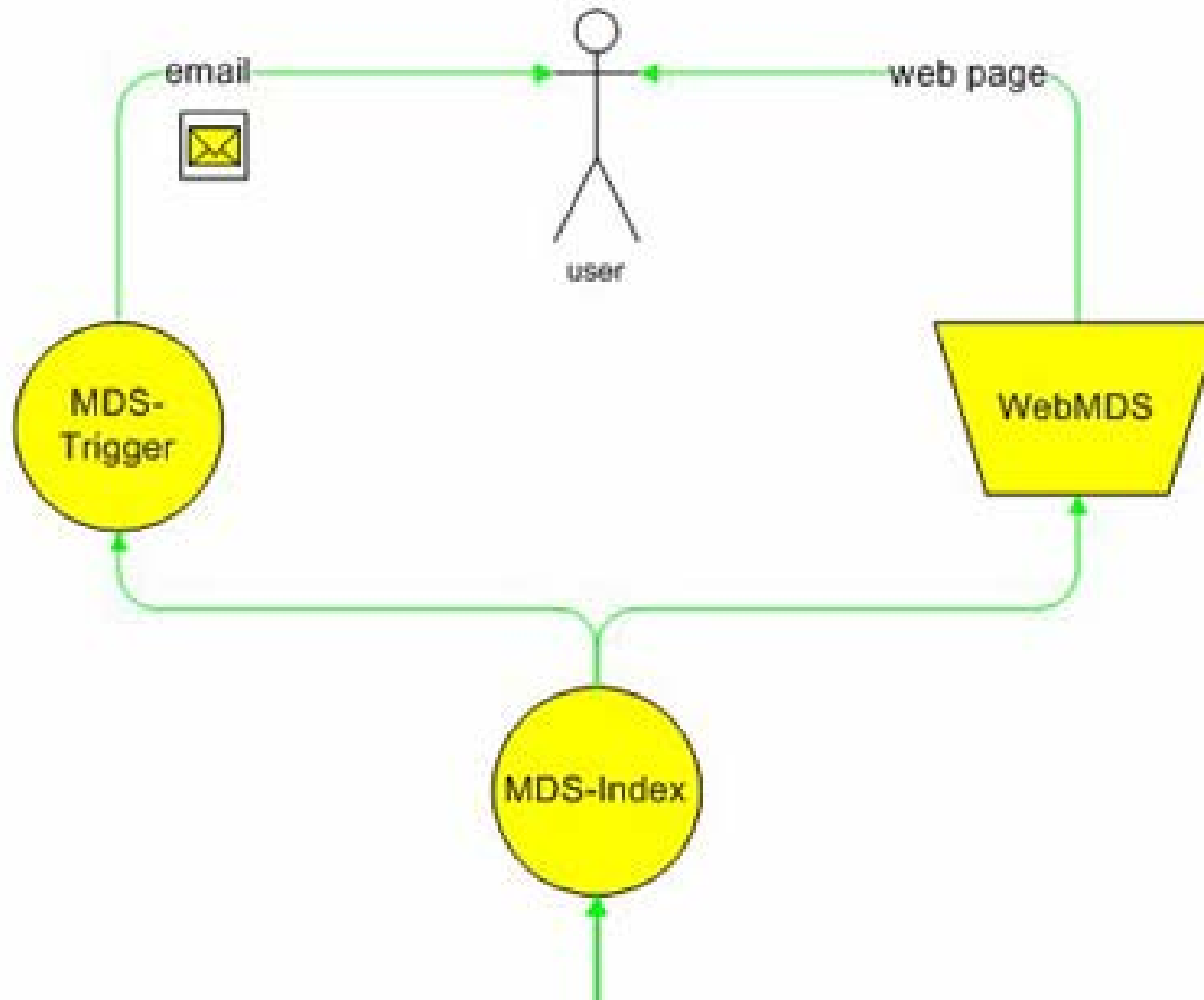
```
UrlCopy uc = new UrlCopy();  
uc.setSourceUrl(from);  
uc.setDestinationUrl(to);  
uc.copy();
```

- **Grid security infrastructure (GSI)**
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- **Collect recent state information from registered Grid resources**
- **Provide browser-based interfaces, command line tools, and Web service interfaces that allow users/machines to query and access the collected information**

- **MDS-Index, which is the main component for collecting structured data from information sources and making the information available via a Web Services interface**
- **MDS-Trigger, which passes this information to an executable (configured by the administrator), which may take an action such as sending email**





- **MDS provides interface for searching information in Index service (using XPath)**
- **Using MDS, Grid services don't have to use traditional UDDI register**

