eclipseCON™ 2008

Service Discovery and Remote Services with the Eclipse Communication Framework

Jan S. Rellermeyer, ETH Zürich
Markus Kuppe, Versant GmbH
Scott Lewis, Code 9

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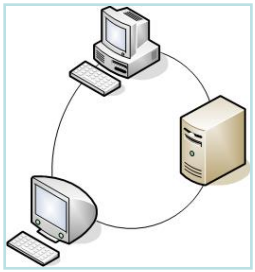
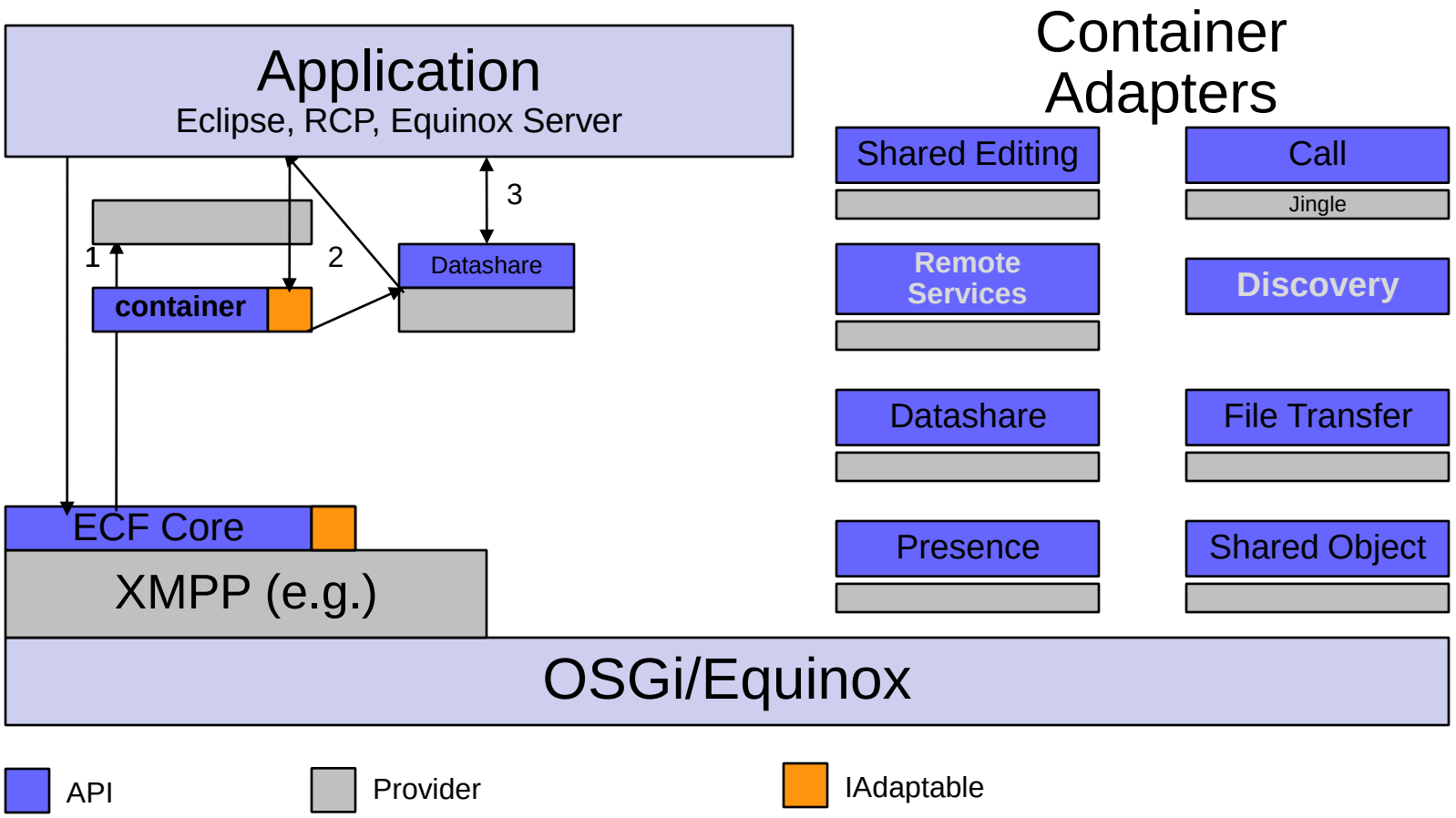
ECF: Eclipse Communication Framework

- Communication platform of Eclipse
  - Eclipse Runtime project
- Goals
  - Support team and community collaboration
  - In combination with the Eclipse IDE
    - Shared editing, file transfer, messaging
    - Talk on Thursday, 11:00 in Silchersaal
  - As an interprocess communication platform for OSGi apps
    - E.g., service discovery, remote services

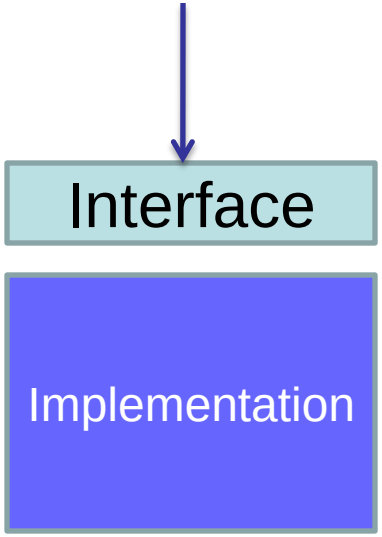


ECF Architecture



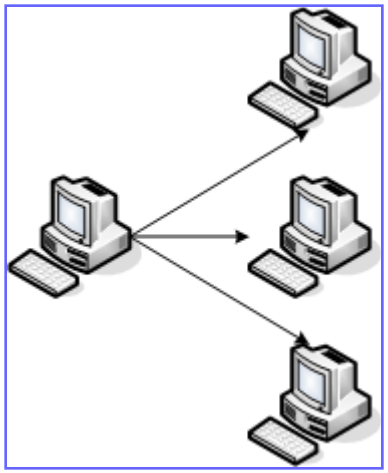
OSGi Services

- OSGi services provide
  - Encapsulation at a larger granularity
  - Loose coupling of functionality
  - Extensibility
  - Abstraction
- Remote services
  - Take this existing boundary to turn an application into a distributed application
  - Provide an abstraction to design distributed apps



OSGi Services in the Network

- Locate a service
  - Implementation for a given interface
  - Service discovery
  - Common knowledge
- Making use of a service
  - Providing service access via ECF API
  - “importing” the service into the local service registry
  - Providing a local service proxy



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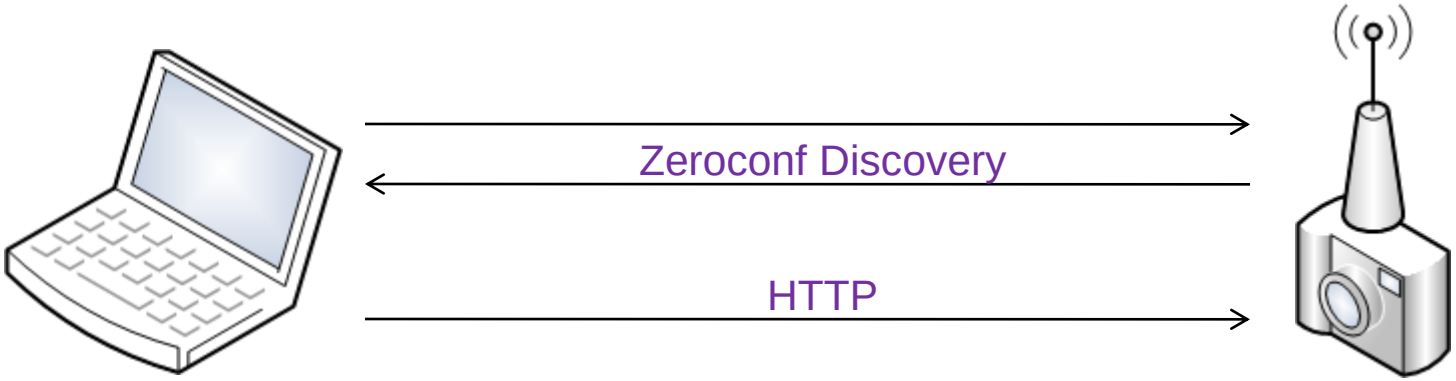
Demo



Client

running RCP App with ECF Discovery (using SLP and mDNS providers) and ECF Remote Services (using R-OSGi Provider)

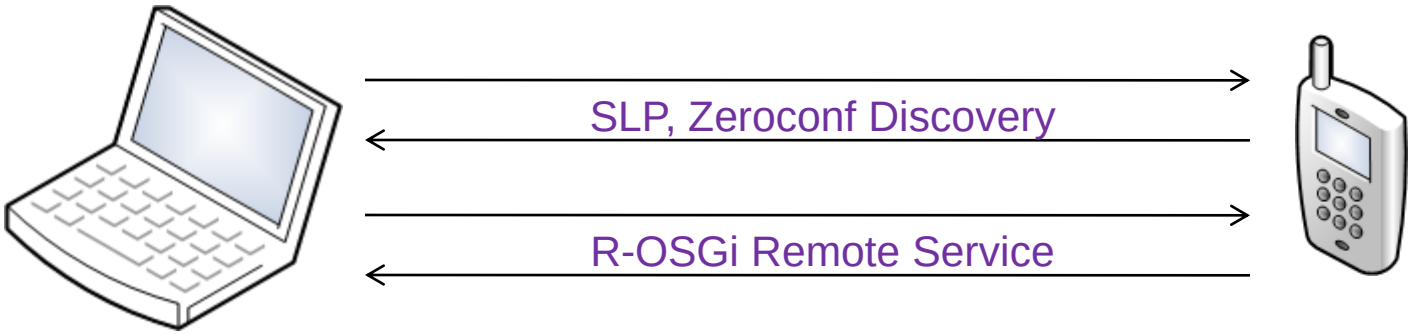
Proprietary Web Cam

supports Zeroconf

ECF Discovery

- Protocol and „space“ agnostic
  - Does not expose protocol internals
  - Not limited to, e.g., the LAN
    - Namespace/ID allows flexibility in service addressing
    - No strict borders to search
- Transparency
  - „automatic mode“
    - Announcement is just a service property in the OSGi context (Extender model if 3rd party bundle)
    - Listener is just a org.osgi.framework.ServiceListener
- Intransparency
  - „manual mode“
    - Consumer gets hold of discovery services and uses it

Demo



Client

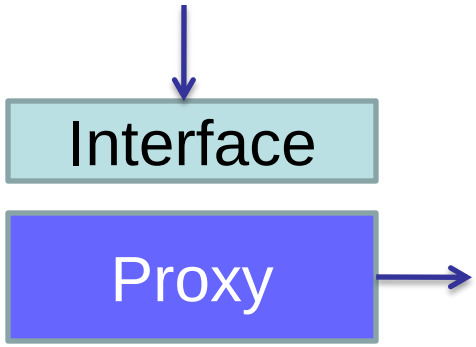
running RCP App with ECF Discovery (using SLP and mDNS providers) and ECF Remote Services (using R-OSGi Provider)

iPhone

running Equinox and ECF, featuring an RemoteEnvInfo and an SMTP remote service

Remote Services

- OSGi services which cross address spaces
- Same ideas:
  - Ask for a service (-reference)
    - Can trigger service discovery
  - Get the service
    - Get a proxy for the service
    - Proxy generation can be proactive or reactive
  - Use the service
    - Method invocations become remote invocations
- Requirement: Non-Invasive



What about RFC 119?

- Focus of RFC 119 is more on integrating existing distribution software with OSGi
- Similar approach: Service Discovery + Remote Services (+ SCA Metadata)
- 119 is still work in progress in the Enterprise Expert Group
- ECF is planning to support RFC 119 in the future

Eclipse ECF Project

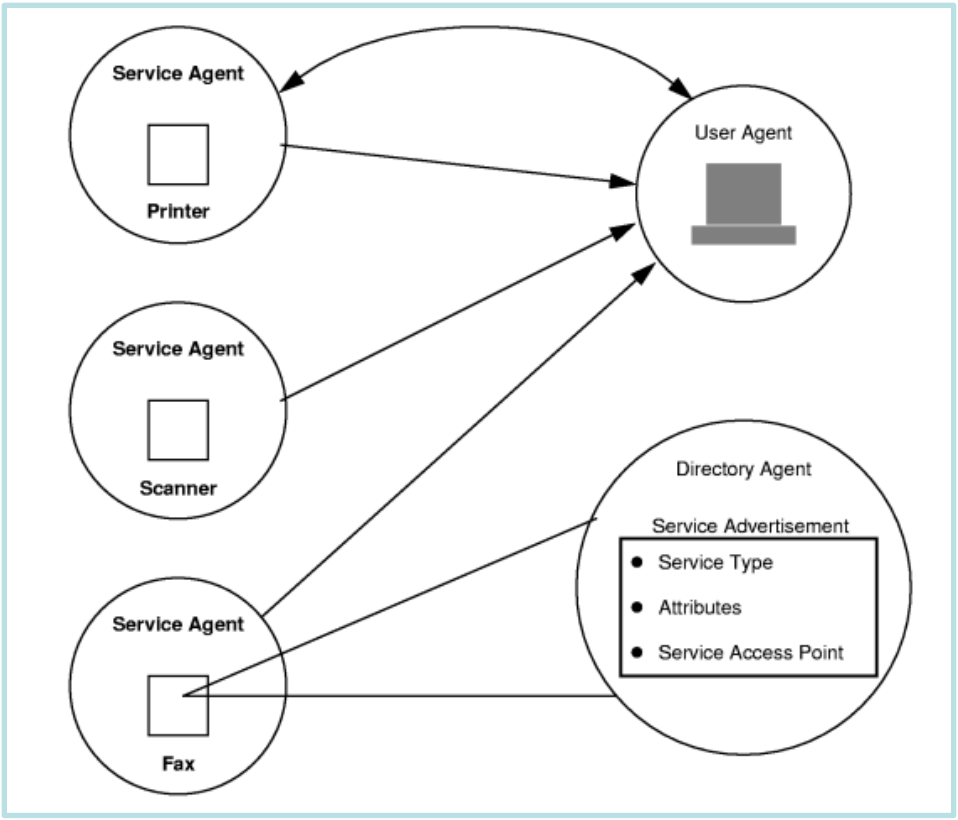
- http://www.eclipse.org/ecf
- http://wiki.eclipse.org/ECF
- WLAN org.eclipse.ecf
  - Demo and slides at: http://kiwi:8080/
  - Remains up and running for a while
- ECF 3.0 will ship with Eclipse Galileo
- ECF 2.1 will get released really soon…

Questions?

Backup Slides

SLP Provider

- SLP protocol
  - Multicast discovery
  - Server (DA)
- Seamless transition
  - DA discovery
- Close(r) to OSGi Services
  - Service properties
  - LDAP filters



mDNS Provider

- DNS-SD on top of Multicast DNS
  - Multicast DNS: p2p name resolution
  - DNS-SD: service discovery
- Idea: Hosts are authoritative for their resources
- One shot and continuous queries
- Well-known from Zeroconf or Apple Bonjour

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R-OSGi Provider

- R-OSGi was one of the first projects to enable remote OSGi services
- Is itself “just a service”
- Picks up services tagged for remote access
- Only the interface is transmitted
- Client builds a dynamic proxy
- Can be added to any OSGi runtime (R3 + R4)
- Protocol and transport-independent

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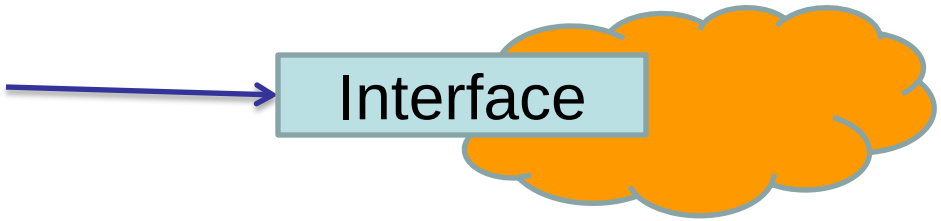
R-OSGi Proxy Bundles

- Synchronized lifecycle with the original bundle
  - Also involves the service properties
  - Changes are propagated to all proxies
- Self-contained units
  - Type Injection
  - Provides exactly the view on the bundle that a client has when looking at the service



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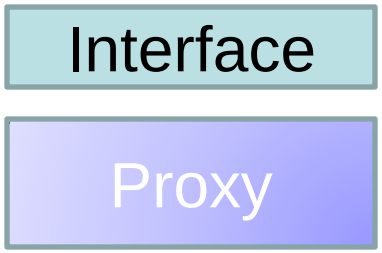
Generic Provider

- DSO model
- Proactive, client/server model
  - In case of XMPP transport, the server is “hidden”
- Connected clients see all service proxies
- By default, no type injection
  - the assumption is that dependant types referenced by the service interfaces are known to all peers
  - Can be customized to go further
- Can be used with XMPP, JMS, JavaGroups

Transparent API

- Service and client remain untouched
- Some entity (not the client) states the demand
- Proxy is already present when the client asks for the service
- The service remains agnostic against distribution, as far as possible
- Seamless and flexible transition from local to remote services



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Non-Transparent API

- Client is aware of distribution
  - Retrieve an `IRemoteService` object
  - Explicit app-level failure handling
- Explicitly call remote invocations
- Call semantics can differ from local service calls
  - One-shot invocation (non-blocking)
  - Asynchronous invocation
    - E.g., with listener callback
    - Futures