


JNDI

Java Naming and Directory Interface

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内容安排

- 命名和目录服务
- JNDI一览
- 功能和代码事例
- JNDI提供者
- 资源
- 引用

Naming Service




关联名字和对象 (bind)

通过名字检索对象(resolve)

举例:

- –RMI Registry
- –CORBA Naming Service (COSNaming)
- –Domain Name Service (DNS)
- –Filesystem

上下文(Contexts)

- 包含一系列绑定和查询操作
- 拥有自己的命名约定
- 举例
  - Filesystem directory: “/”
  - DNS domain: “edu”
  - LDAP: “c=us”
- 命名系统是一个上下文集合 (相同类型)
  - names in a particular system = namespace

Names

- 关联一个对象的逻辑标识
- Localhoat=>127.0.0.1
- 命名约定通过命名系统定义
  - -- /dir/dir2/file for UNIX
  - -- drive:\dir\string for DOS
  - -- cn=dan, o=ISP for LDAP
  - -- aplcenmp.apl.jhu.edu for DNS

Names

- 原子(Atomic)Name
  - name used in a binding
  - only meaningful in a context
  - Ex. filename in a directory
- 复合(Compound)Name
  - sequence of atomic names
  - /usr/bin/ls
  - conforms to naming convention of name space

Names

- 混合(Composite)Name
  - Spans multiple naming systems
  - http://www.apl.jhu.edu/~weimer/
    - URL scheme id: http
    - DNS: www.apl.jhu.edu
    - UNIX and webserver: /usr/weimer/public_html
- 分解(Resolution)

  Object o = ctx.lookup(“usr/weimer/public_html”);

目录服务

- 目录对象表示一个对象
- 对象可能给出属性(Objects may be given attributes)
- 能获得一个对象的属性和通过属性找到对象

- 举例
- X.500 - ISO standard. Complex.
- LDAP - Simplified X.500 over TCP/IP
- NDS - Novell Directory Services.
- NIS - Directory service for Solaris

JNDI的目标




- 提供一个一致的API去访问不同的命名和目录服务

客户端只需要学习一种API

- 不同的命名和目录服务能被组合进一个逻辑系统
- 不需要修改客户端就能加入新的命名服务实现

JNDI架构

Java Client Application

JNDI API

JNDI Naming Manager

JNDI Service Provider Interface

DNS | LDAP | RMI | CORBA | Anything

JNDI架构

- 应用程序接口 (API)
  - API for client programmer
  - 统一接口(Unifying interface)
- Service Provider Interface (SPI)
  - For vendors enabling JNDI access to their naming/directory service

JNDI API

- Included in Java 2 SDK v 1.3
- Have to download for JDK 1.1 and SDK 1.2
- Packages
  - javax.naming
  - javax.naming.directory
  - javax.naming.event
  - javax.naming.ldap
  - javax.naming.spi

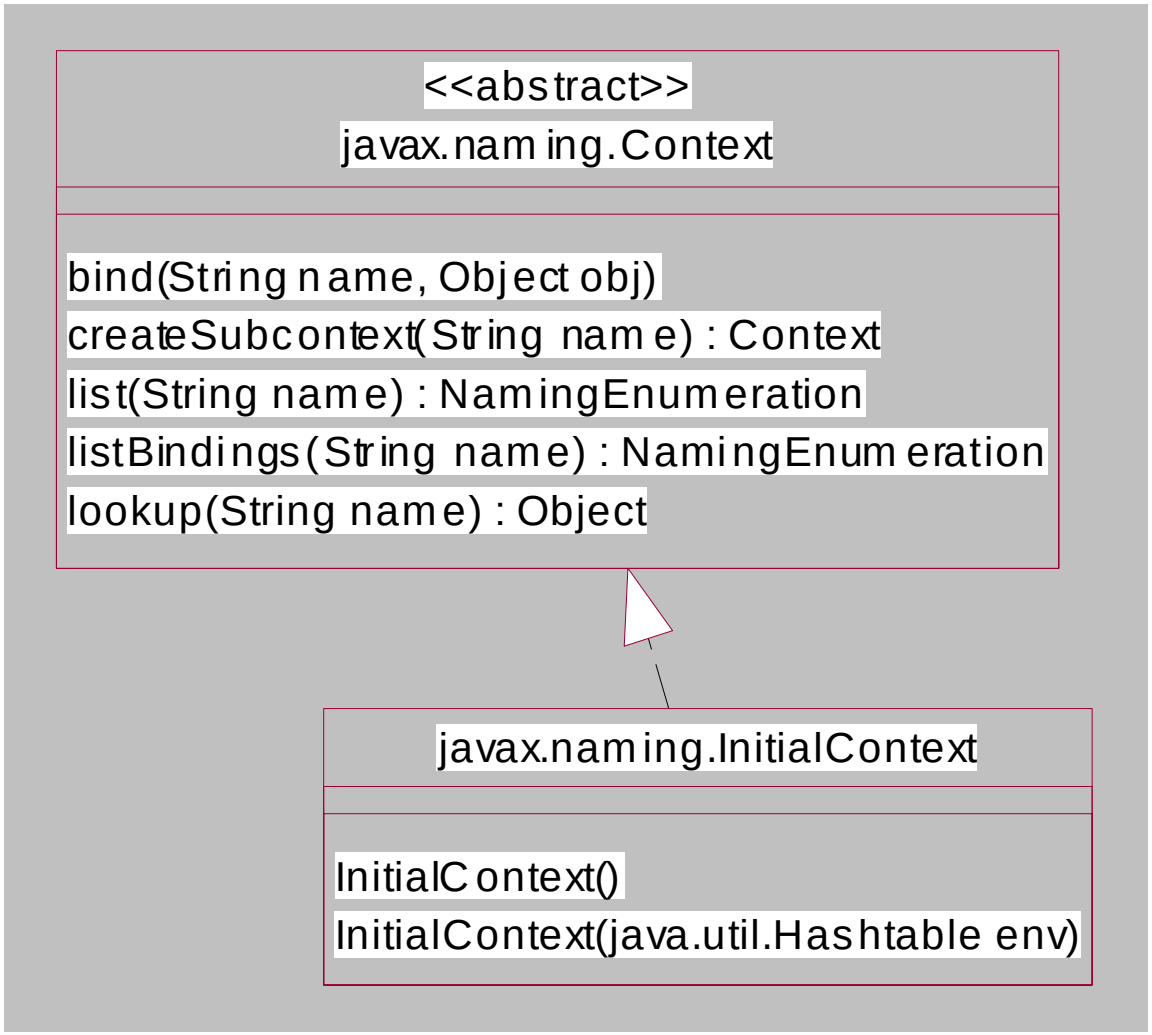
服务提供者(Service Providers)

- Implementation for underlying products
- Included in Java 2 SDK 1.3
  - LDAP
  - COSNaming
  - JNDI over RMI Registry
- Have to download for previous versions
  - http://java.sun.com/products/jndi/

共同JNDI任务(Tasks)

- Obtain reference to initial context
- Context Operations
  - List children of a context
  - Bind names to objects
  - Lookup objects via name
  - Create/destroy contexts
  - Note: NamingException can be thrown from most Context operations

JNDI 上下文(Contexts)



获得初始上下文

```
import javax.naming.*;

java.util.Properties props = new java.util.Properties();
props.put(Context.INITIAL_CONTEXT_FACTORY,
                "com.sun.jndi.fscontext.RefFSContextFactory");
props.put(Context.PROVIDER_URL, "file:///");

Context initContext = new InitialContext( props );
```

初始上下文

- Starting point in the namespace
- All operations performed are relative to the initial context
- Specify service provider with property

```
props.put(Context.INITIAL_CONTEXT_FACTORY”
,
    “com.sun.jndi.fscontext.RefFSContextFactory” );
```

初始上下文

- Specify provider-specific properties
- LDAP

```
props.put(Context.PROVIDER_URL, “ldap://host:port”);
props.put(Context.SECURITY_PRINCIPAL, “user” );
props.put(Context.SECURITY_CREDENTIALS,
    “password”);
```

- File System

```
props.put(Context.PROVIDER_URL, “file://tmp/”);
```

- Create

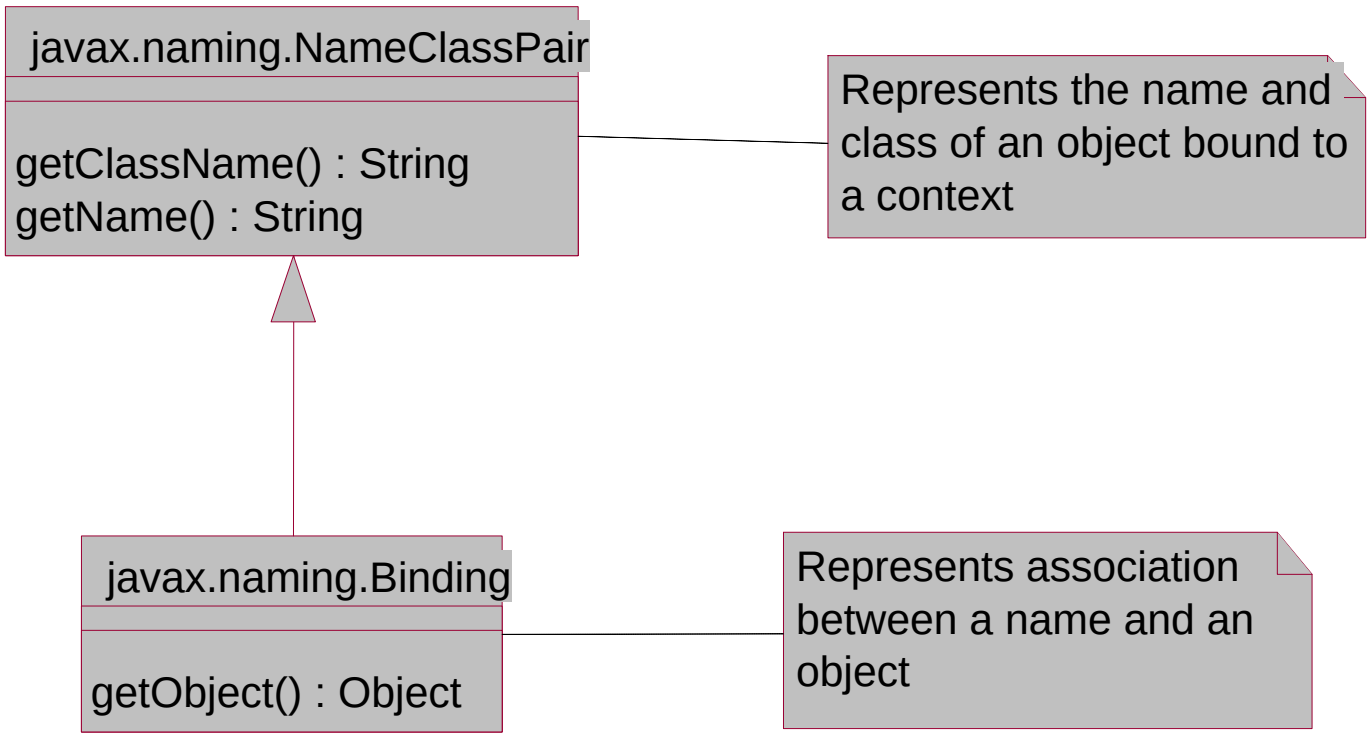
```
InitialContext initContext = new InitialContext( props );
```

列举children

```
NamingEnumeration children = initContext.list("");
while( children.hasMore() )
{
    NameClassPair nc = (NameClassPair) children.next();
    System.out.println(nc.getName());
    System.out.println(nc.getClassName());
}
```

- list() returns a NamingEnumeration of NameClassPair objects
- listBindings() returns a NamingEnumeration of Binding objects

NameClassPair and Binding



NamingEnumeration

- Extends java.util.Enumeration
- Throws exception when no more entries in the enumeration
- Allows partial results to be returned and exception throws upon access where the problem occurred
  - i.e. hasMore() will throw the exception
- Limit of search with search controls

绑定名字到一个对象

- Bind name to object within a context

```
File f = new File("/tmp/dan");
tmpDirContext.bind("dan", f );
```

- NameAlreadyBoundException occurs if "dan" is already bound in the tmp context
- Can use unbind() or rebind()

对象查询

Lookup object in a context

- –String name; Object o = initContext.lookup(name);
- –name can be compound
  - –“/usr/tmp/dir/myfile”
  - –Separator is not standardized !
- –Class returned is up to provider !
- –Filesystem provider returns
  - •File for files
  - •[Ref]FsContext for directories
- –Novell NDS can return OrganizationalDirContext
- –Containers should implement Context

上下文生命周期操作

- ctx.createSubcontext(String name)
  - JNDI Provider chooses actual implementation of new context.
  - Ex. File System Provider will create a directory
  - No way to create a file
- ctx.destroySubcontext(String name)
  - Can not destroy current object with name of “”
  - Ex. Remove directory in a filesystem

目录操作

javax.naming.directory.DirContext

extends javax.naming.Context

examine/search attributes associated with a directory object

javax.naming.directory.Attribute

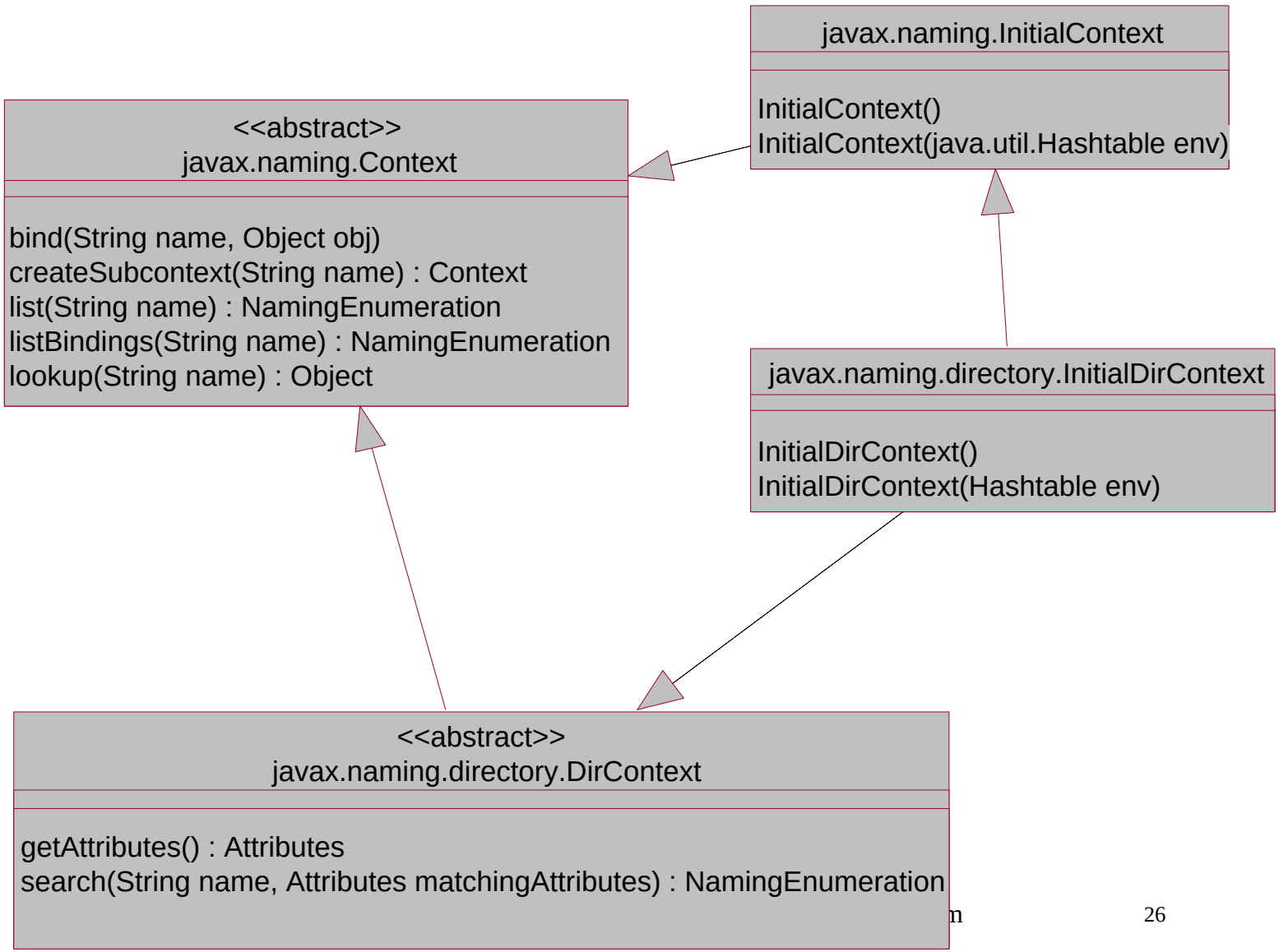
name and set of values

getAttributes(String name) : Attributes

modifyAttributes(String name, ….)

目录操作


JAVA


javax.naming.InitialContext
InitialContext()
InitialContext(java.util.Hashtable env)
<<abstract>>
javax.naming.Context
bind(String name, Object obj)
createSubcontext(String name) : Context
list(String name) : NamingEnumeration
listBindings(String name) : NamingEnumeration
lookup(String name) : Object
javax.naming.directory.InitialDirContext
InitialDirContext()
InitialDirContext(Hashtable env)
<<abstract>>
javax.naming.directory.DirContext
getAttributes() : Attributes
search(String name, Attributes matchingAttributes) : NamingEnumeration

属性

- DirContext contains an Attributes object for each contained binding
- Common LDAP Attributes
  - c = Country
  - o = Organization
  - ou = Organizational Unit
  - cn = Common Name (typically first or full name)
  - sn = User's surname
- Attribute Name
  - –referred to as attribute id
    - determines type of attribute (attribute type definition)
    - attribute syntax definition specifies the syntax for the attribute's value and whether it can have multiple values
- reverse lookup;content-based searching

JNDI and RMI

- Can put standard interface on RMI registry

```
Properties props = new Properties();
props.put(Context.INITIAL_CONTEXT_FACTORY,
      “com.sun.jndi.rmi.registry.RegistryContextFactory”);
props.put(Context.PROVIDER_URL, “rmi://host:port”);
Context ctx = new InitialContext(props);
ctx.rebind(“Teller”, someRMIObject );
……..
Teller t = (Teller) ctx.lookup(“Teller”);
```

JNDI and JDBC

- JDBC Data Source
  - 发展(Evolution) of the JDBC Driver Manager
  - Typically stored in a JNDI tree
  - connection pooling support
  - Methods
    - ds.getConnection(String name, String password)
    - conn.close()

JNDI and EJB

- Home objects for beans are stored in JNDI
- In order to create a bean:

```
InitialContext ic = new InitialContext( props );
TellerHome th = (TellerHome)
    ic.lookup("TellerHome");
th.transfer( … );

// Remote stub typically returned to client
```

JNDI and J2EE Applications

- InitialContext
  - supplied by Container
  - accessed by Component using default ctor
    - InitialContext rootCtx = new InitialContext();
- Properties
  - supplied to Container in deployment descriptor
  - accessed by Component through special context
    - Object object = rootCtx.lookup(“java:comp/env/myObject”);

JNDI 1.2 功能

- 事件通告(Event Notification)
- LDAPv3 Extensions and Controls
- Service Provider Support

javax.naming.spi

JNDI Providers

- LDAP
  - com.novell.naming.service.nds.NdsInitialContextFactory
- NIS
  - com.sun.jndi.nis.NISCtxFactory
- NIS+ (future)
- RMI
  - com.sun.jndi.rmi.registry.RegistryContextFactory
- COSNaming
- Files
  - com.sun.jndi.fscontext.[Ref]FSContextFactory

LDAP Products




Publicly accessible

- –ldap://ldap.Bigfoot.com
- –ldap://ldap.four11.com
- –ldap://ldap.InfoSpace.com

总结

- JNDI客户端能访问以下资源:
  - printers
  - fax machines
  - databases (JDBC 2.0 extensions)
  - user credentials
  - object references
- contained in multiple underlying naming service implementations using the same API

参考资料

- http://java.sun.com/products/jndi
  SUN公司的JNDI站点
- http://www.huihoo.org/jfox/jfoxns/
  JFoxNS (JFox命名服务)
- http://www.huihoo.com
  国内一个关于中间件的专业站点

结束

谢谢大家！

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