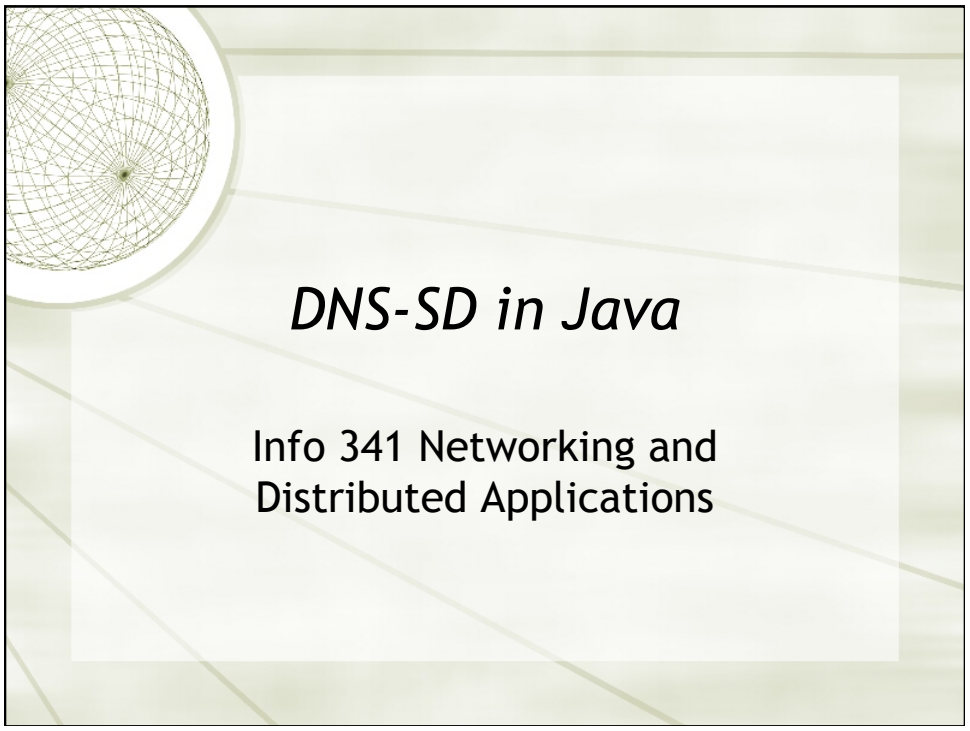
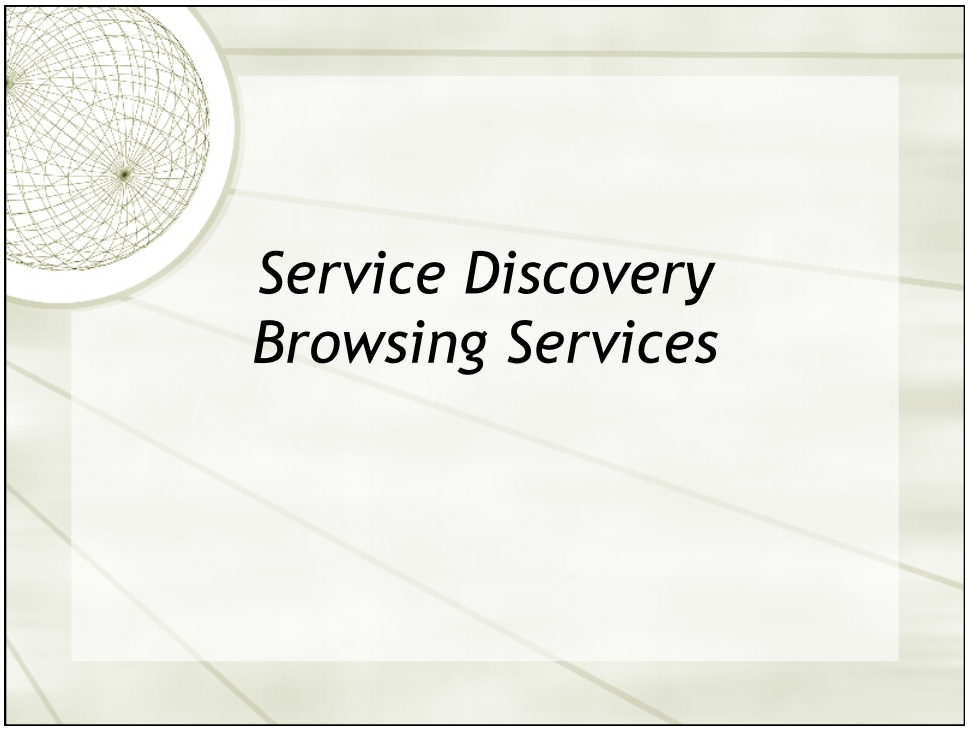

DNS-SD in Java
Info 341 Networking and
Distributed Applications


Service Discovery
Browsing Services

DNS-SD Command

```
dns-sd -E                  (Enumerate recommended registration domains)
dns-sd -F                      (Enumerate recommended browsing domains)
dns-sd -B        <Type> <Domain>        (Browse for services instances)
dns-sd -L <Name> <Type> <Domain>           (Look up a service instance)
dns-sd -R <Name> <Type> <Domain> <Port> [<TXT>...] (Register a service)
dns-sd -P <Name> <Type> <Domain> <Port> <Host> <IP> [<TXT>...]  (Proxy)
dns-sd -Z        <Type> <Domain>   (Output results in Zone File format)
dns-sd -Q <FQDN> <rrtype> <rrclass> (Generic query for any record type)
dns-sd -C <FQDN> <rrtype> <rrclass>   (Query; reconfirming each result)
dns-sd -X udp/tcp/udptcp <IntPort> <ExtPort> <TTL>   (NAT Port Mapping)
dns-sd -G v4/v6/v4v6 <Hostname>  (Get address information for hostname)
dns-sd -V    (Get version of currently running daemon / system service)
dns-sd -A                      (Test Adding/Updating/Deleting a record)
dns-sd -U                                  (Test updating a TXT record)
dns-sd -N                              (Test adding a large NULL record)
dns-sd -T                             (Test creating a large TXT record)
dns-sd -M      (Test creating a registration with multiple TXT records)
dns-sd -I   (Test registering and then immediately updating TXT record)
dns-sd -S                 (Test multiple operations on a shared socket)
```

Parameters

- Name
  - A string, text to name the service
- Domain
  - “local” is the special domain for mDNS and is the only one supported
- Port
  - Protocol port for the service

Parameters

- Type
  - Special strings that indicate a service
  - Must be registered
    - http://www.dns-sd.org/ServiceTypes.html
  - Examples

    _http._tcp
    _daap._tcp
    _ftp._tcp
    _ichat._tcp
    _ldap._tcp
    _printer._tcp

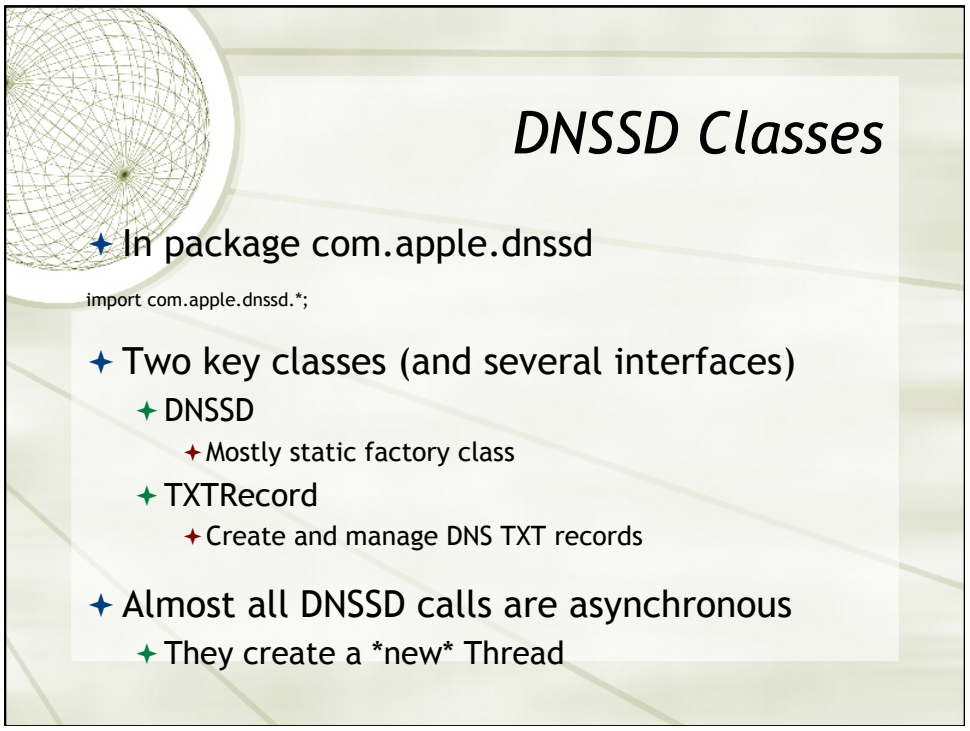
Browse

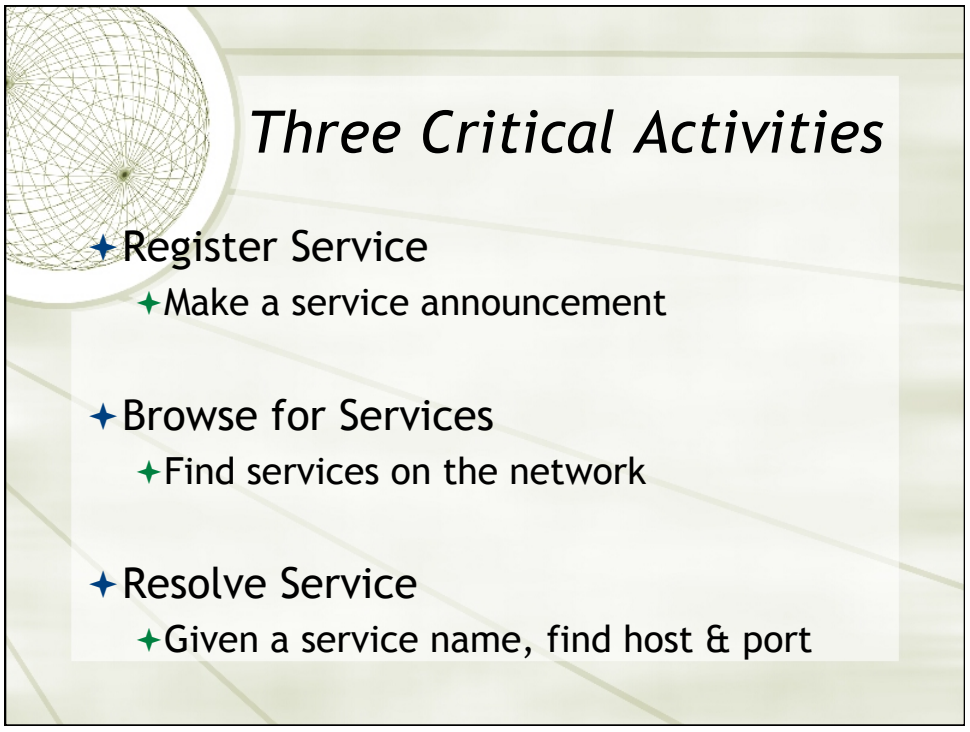
- dns-sd -B <Type> <Domain>
  - dns-sd -B _http._tcp
  - dns-sd -B _printer._tcp
  - dns-sd -B _ftp._tcp
  - dns-sd -B _smb._tcp

Register

- dns-sd -R <Name> <Type> <Domain> <Port>
  - dns-sd –R “Service 1” _fake._tcp local 25001
  - dns-sd –R “Service 1” _fake._tcp local 25002
  - dns-sd –R “Service 2” _fake._tcp local 25003

Java APIs


DNSSD Classes
In package com.apple.dnssd
import com.apple.dnssd.*;
Two key classes (and several interfaces)
DNSSD
Mostly static factory class
TXTRecord
Create and manage DNS TXT records
Almost all DNSSD calls are asynchronous
They create a *new* Thread


Three Critical Activities
Register Service
Make a service announcement
Browse for Services
Find services on the network
Resolve Service
Given a service name, find host & port

Browsing

- Mechanism for finding services

```
DNSSDService browser = null;
browser = DNSSD.browse(sd_service, myBrowseListener);
```

- "browser" is a thread that calls methods on myBrowseListener
  - serviceFound()
  - serviceLost()

Browse Listener Interface

- BrowseListener
  - The more complex part of browsing

```
public class MyBrowseListener implements BrowseListener {
    public void serviceFound (DNSSDService br, int flags, int ifIndex, String serviceName,
        String regType, String domain) {
        …
    }
    public void serviceLost (DNSSDService br, int flags, int ifIndex, String serviceName,
        String regType, String domain) {
        …
    }
    public void operationFailed (DNSSDService service, int errorCode) {
        …
    }
    <other methods>
}
```


Things to Notice
Across Register, Browse, & Resolve
Initiate asynchronous services (threads)
Must eventually call stop()
Pass some form of Listener object
Listener interfaces implement callback methods
All Listeners implement “operationFailed”