Programming
Handheld Systems

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Networking
Today's Topics

Networking
Android networking Classes
Processing HTTP Responses
NETWORKING

Early handheld devices gave us mobility
But with limited connectivity
Today’s devices have greater mobility and connectivity
Many applications use data and services via the Internet
NETWORKING

Android includes multiple networking support classes, e.g.,
java.net – (Socket, URL)
org.apache – (HttpRequest, HttpResponse)
android.net – (URI, AndroidHttpClient, AudioStream)
Example Application

Application sends a request to a networked server for earthquake data. Then displays the requested data.
Sending HTTP Requests

Socket
HttpURLConnection
AndroidHttpClient
HttpURLConnection

Higher-level than Sockets

Less Flexible API than
HttpAndroidClient
AndroidHttpClient

An implementation of Apache's DefaultHttpClient
Breaks HTTP Transaction into separate Request and Response Objects
Processing HTTP Responses

Several popular formats including JSON XML
Javascript Object Notation (JSON)

Intended to be a lightweight data interchange format
Data packaged in two types of structures:
Maps of key/value pairs
Ordered lists of values

See: http://www.json.org/
EARTHQUAKE DATA (JSON OUTPUT)

http://api.geonames.org/earthquakesJSON?north=44.1&south=-9.9&east=-22.4&west=55.2&username=demo
Earthquake Data (JSON Output)

{
"earthquakes": [
{"eqid":"c0001xgp","magnitude":8.8,"lng":142.369,
 "src":"us", "datetime":"2011-03-11 04:46:23","depth":
 24.4,"lat":38.322}
{"eqid":"2007hear","magnitude":8.4,"lng":101.3815,
 "src":"us","datetime":"2007-09-12 09:10:26","depth":
 30,"lat":-4.5172},
...
{"eqid":"2010xkbv","magnitude":7.5,"lng":91.9379,
 "src":"us","datetime":"2010-06-12 17:26:50","depth":
 35,"lat":7.7477}
]
}
eXtensible Markup Language (XML)

XML documents can contain markup & content

Markup encodes a description of the document's storage layout and logical structure

Content is everything else

See http://www.w3.org/TR/xml
Earthquake Data (XML)

http://api.geonames.org/earthquakes?
north=44.1&south=-9.9&east=-22.4&
west=55.2& username=demo
EARTHQUAKE DATA (XML)

<geonames>
<earthquake>
<src>us</src>
<eqid>c0001xgp</eqid>
<datetime>2011-03-11 04:46:23</datetime>
<lat>38.322</lat>
<lng>142.369</lng>
<magnitude>8.8</magnitude>
<depth>24.4</depth>
</earthquake>
...
</geonames>
Parsing XML

Several types of parsers available

DOM - Converts document into a tree of nodes

SAX - Streaming with application callbacks

Pull - Application iterates over XML entries
Next Time

Graphics & Animation