



# J2ME™ Clients talking to J2EE™ servers

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# Agenda

- Problems in end-to-end development
- J2ME Wireless Connection Wizard
- Demonstration
- Summary
- Questions

## J2ME Clients for J2EE

- Complementary technologies
- Communicate using HTTP
- Smart clients can process data themselves



**Client**



**Server**

## Question

What makes it hard to develop J2ME connected clients?

# What Makes it Hard to Develop Connected J2ME Clients?

Wide variety of **devices**



Little **memory**

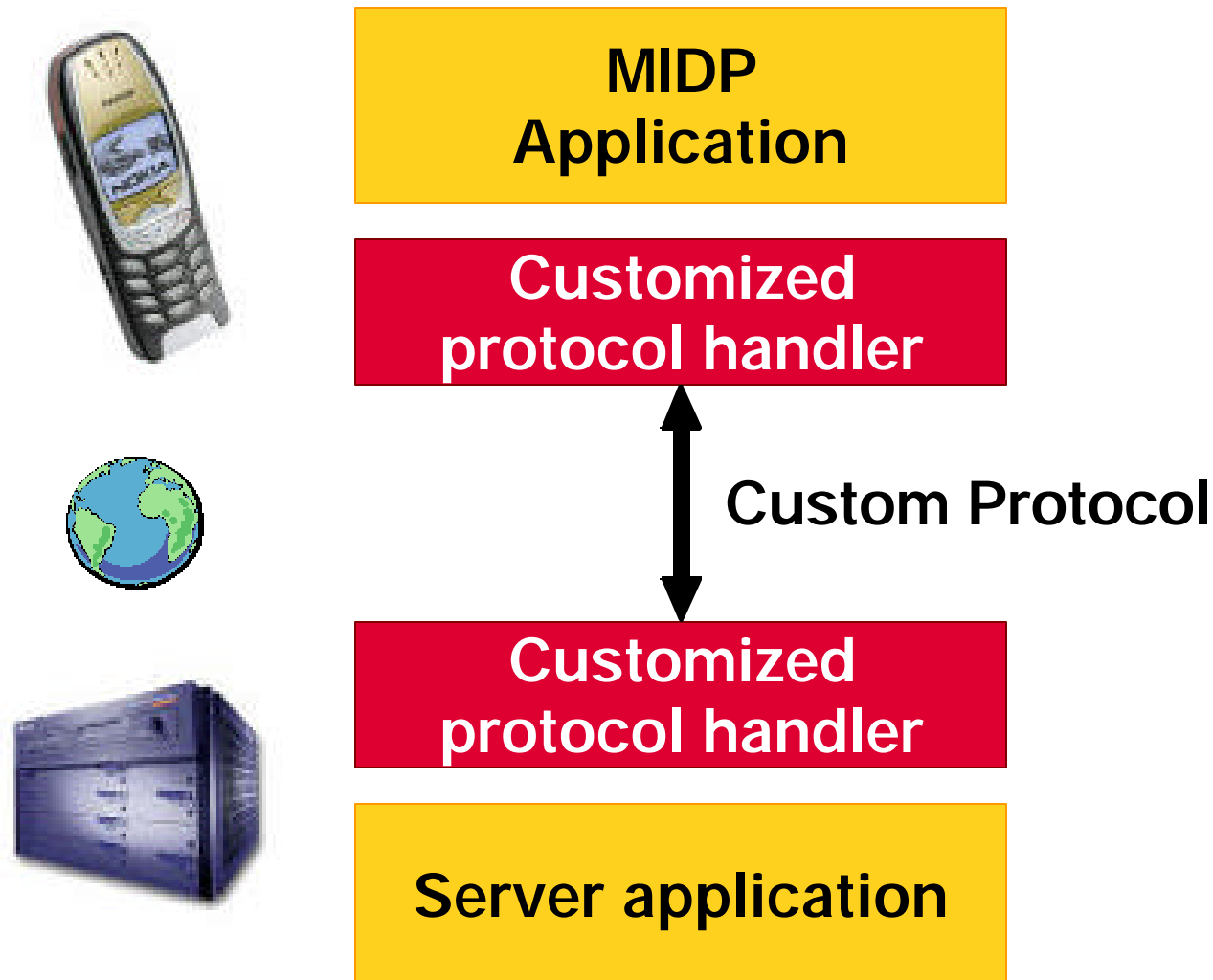
Very limited **application size**

Very low **processing power**

# Current J2ME/J2EE Development

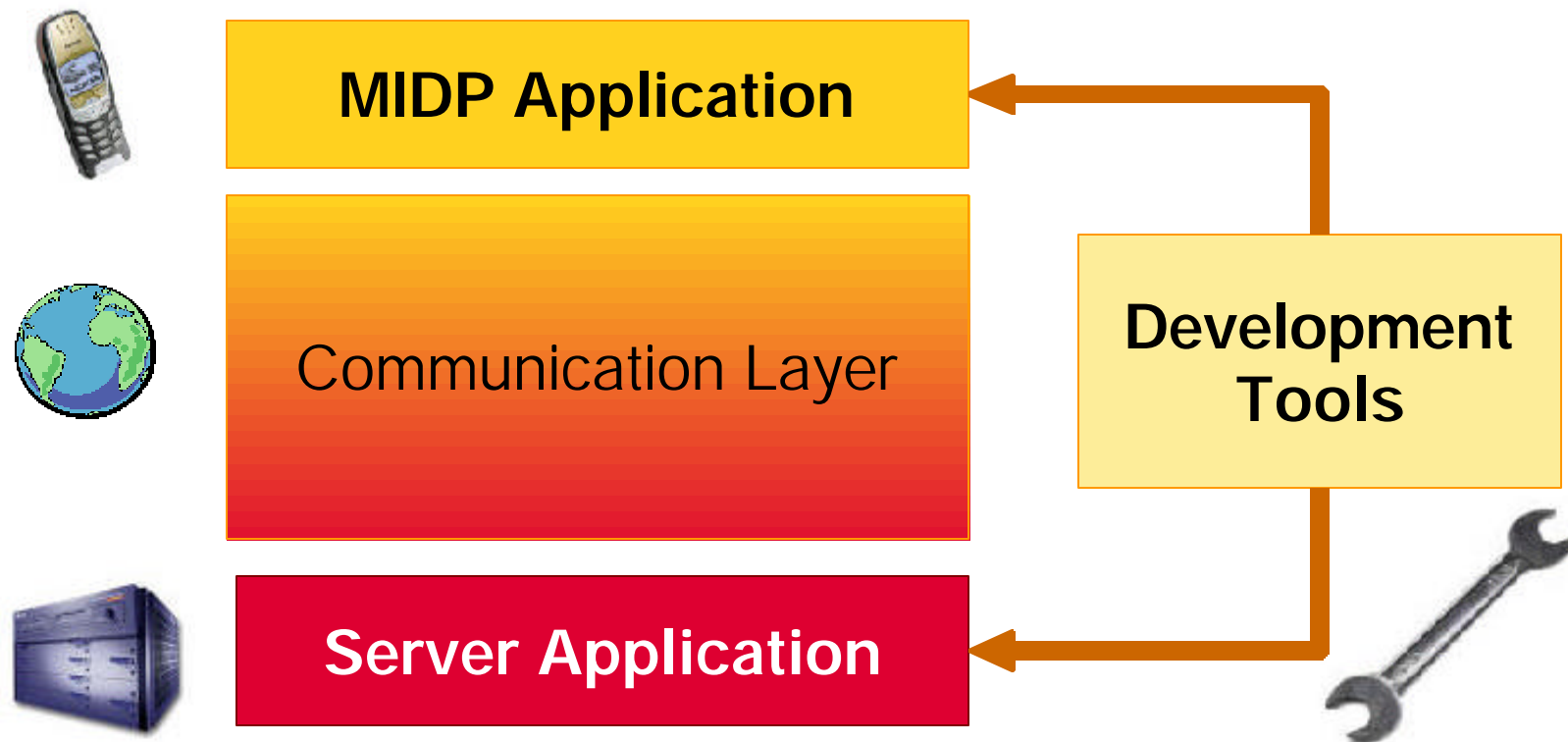
- API libraries need too much memory for today's devices
- Developers create custom protocols
  - Increased development time
  - Hard to debug
- Poor tool support
  - Client tools not integrated with server tools

# Current J2ME/J2EE Architecture



# Ideal End-to-End Development

- Transparent communication layer
- Integrated tools





# J2ME Wireless Connection Wizard Concept

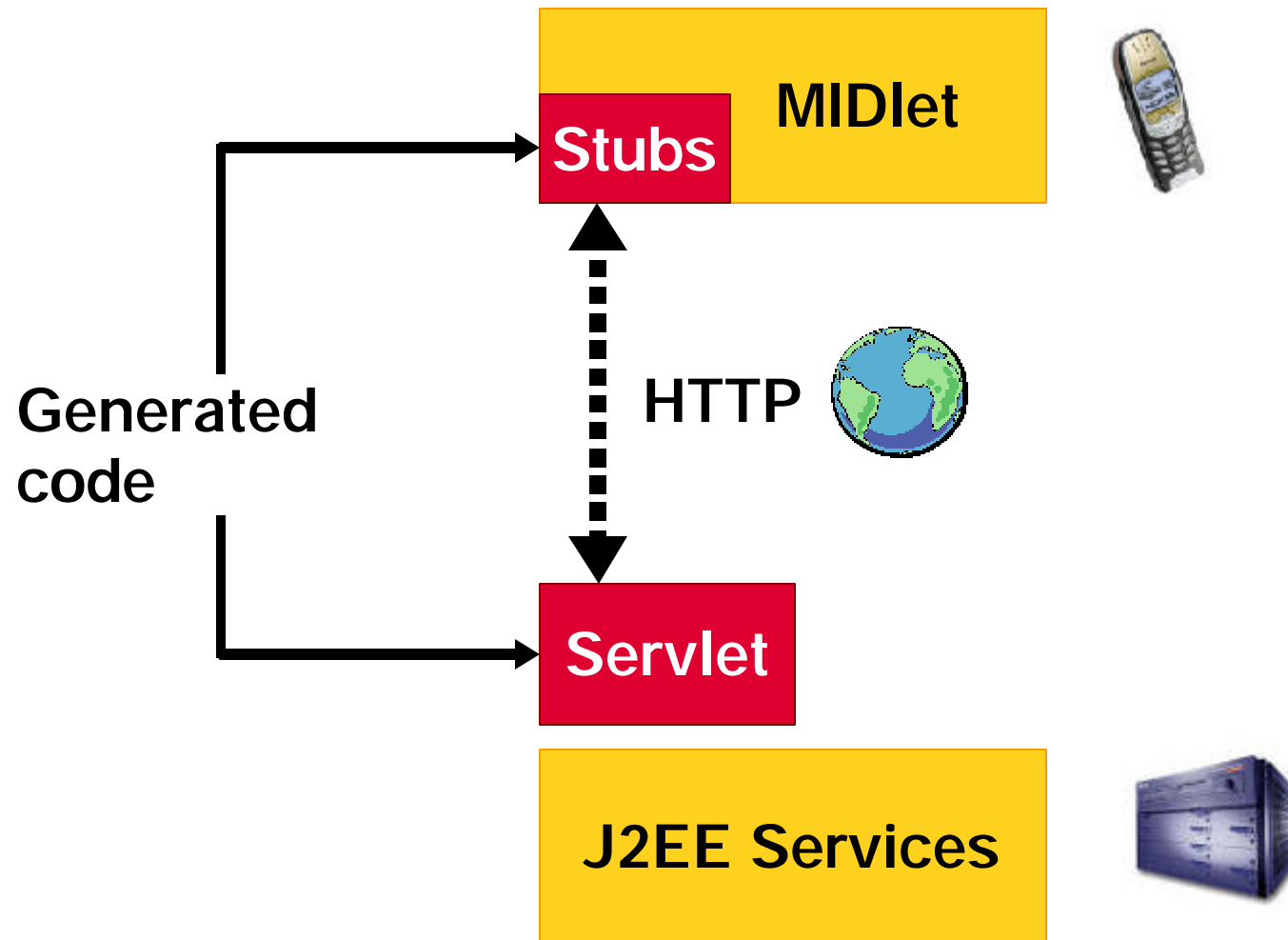
- Tool for generating an optimized communication layer
- Generates MIDP 1.0 compliant code on the client, and servlet code for the server
  - the code that is otherwise most error-prone
- Fully integrated with Sun ONE Studio™

# Let The Tool Do the Work

- Let the tool
  - handle the protocol
  - deal with devices' quirks
  - help debug
  - optimize the code
- You develop the application



# J2ME/CW Application Architecture



## J2MEW CW Workflow

- Select locations of client and server files
- Select code generation options
- Select services to be exported to client
- Wizard creates everything you need to build and deploy your client:
  - Servlet classes
  - Servlet mappings
  - Client infrastructure for calling services
  - Client stub methods

# Using J2ME Client Stub Methods

- Service method (on J2EE server)

```
public class StockService {  
    public int getQuote(String stockTicker) {  
        /* ... */  
    }  
}
```

- Using the client stub method (in MIDlet)

```
String url = "http://localhost:8081/stockServlet";  
StockClient client = new StockClient(url);  
try {  
    int stockQuote = client.StockService_getQuote("SUNW");  
} catch (IOException e) {  
    /* ... */  
}
```

# Using Grouped Calls

- Calls to multiple methods in a single HTTP Request/Response
- Using the client stub method (in MIDlet)

```
client.StockService_getQuoteGrouped("SUNW");  
client.StockService_getQuoteGrouped("IBM");  
client.StockService_getQuoteGrouped("MSFT");  
try {  
    Enumeration results = client.getGroupedResults();  
  
    /* process results */  
  
} catch (IOException e) {  
    /* ... */  
}
```

# Session Handling

- Each client accesses its own objects
  - One instance of each server-side object type per client
  - Session data can be stored in instance fields of server object
  - Timeout for cleaning up old objects

# Data Types

- Primitives
  - boolean, byte, short, char, int, long
- Arrays of primitives
  - Boolean[ ], byte[ ], short[ ], char[ ], int[ ], long[ ]
- String, String[ ]



# Features of Generated Code

- Compact code without redundancy
  - Adaptive code generation
  - Tiny footprint (< 2 Kbytes for core)
- Low bandwidth, low computation overhead

# Server Deployment

- Tool creates servlet classes and definitions
- Ready to deploy from Sun ONE Studio
- Or create WAR (Web Archive) file and deploy in an external application server:
  - Sun ONE Application Server
  - Apache Tomcat
  - Other application server

# Deployment on J2ME Devices

- J2ME devices do not all have perfect MIDP 1.0 implementations
- Generated code works as is on
  - Nokia 6310i, 7210
  - Motorola iDEN i80s, i90c



# DEMO

# Summary

- Developing J2ME connected clients is hard
- The J2ME Wireless Connection Wizard accelerates your development process by handling the networking layer for you
- Integrated solution
- Code generated is compatible with MIDP 1.0 and lightweight enough even for today's devices

# What next?

Try it out:

<http://developer.java.sun.com/>

Tell us what you think:

[j2mewcw-comments@sun.com](mailto:j2mewcw-comments@sun.com)

# Q&A



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