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## Developing information services for APRS with digi-net and Microsoft Visual Studio.

By Larry da Ponte – N7BCP

# DIGI\_NED

(what is it?)

- Low level software package for creating APRS digipeaters
- Configurable
- Multiple ports
- Call substitution
- Manipulation of digi path
- Duplicate checker
- MHEARD
- Telemetry broadcasts and queries
- Satellite tracking
- Weather station facilities
- Information and objects

# DIGI\_NED

(who and why)

- Netherland amateurs Henk PE1DNN and Remko PE1MEW had an idea for weather stations.
- APRS was a good fit
- APRS model would provide the clients.
- Use cheap/obsolete PCs – 286 class.
- Europe – APRS is on 144.800 – novices are not allowed digital here – they are however on 70cm so cross-band functionality was needed.
- Suitable digipeater software did not exist so they started the DIGI\_NED project.
- DIGI\_NED developed on top of AX.25 layer
- DIGI = digipeater, NED = Nederland (means The Netherlands – in Dutch) showing pride in their country.
- DIGI\_NED is open source – you can download the source and modify it.

# Supported Operating Systems

- DOS
- Linux (virtually any distribution)
- Windows (9X/2K/XP/2003)

# Hardware

- PC 286 (DOS version)
- PC running Windows 9x/XP/2k/server or Linux.
- Supports AGW Packet Engine

# Information and objects

- DIGI\_NED.MES file
- Match pattern and send response
- First character determines how the response is sent back:
- Lines starting with ';' are transmitted as "objects"

?HO|HOsp|HOspital

;SNOQHOSP \*010000z4730.80N/12149.60WhSnoqualmie Valley  
Hospital

Hostpital object sent

# Information and objects

- Lines with ':' are transmitted as messages

?BLN

Bulletin sent!

:MSDIGI :Nothing to report.

- Lines with ! run a program

?find \*

! find.exe %z %q

>find.out

# Developing for Windows

- Microsoft .Net Framework
- Visual Studio Development tools
- Run on Windows 9x, 2000, XP, and Vista



# Microsoft .Net

- A software component that can be added to the Windows operating System
- Provides pre-coded solutions to common programming problems UI, data, web, network.
- Intended to be used for new windows applications.
- Language neutral – currently over 20 programming languages
- Current version of .Net is 2.0

# Visual Studio

- Development environment for computer programmers
- Lets developers create standalone applications, web sites, web applications, and web services
- Supported platforms include Windows servers, workstations, Pocket PC, Smart Phones, and web browsers.

# .Program basics

- Variables
- Data types (string, int)
- Arrays
- Command-line arguments
- Program flow (if/else)
- Network access
- File system (read/write)
- Error handling (try/catch/finally)

# Hello World Demo

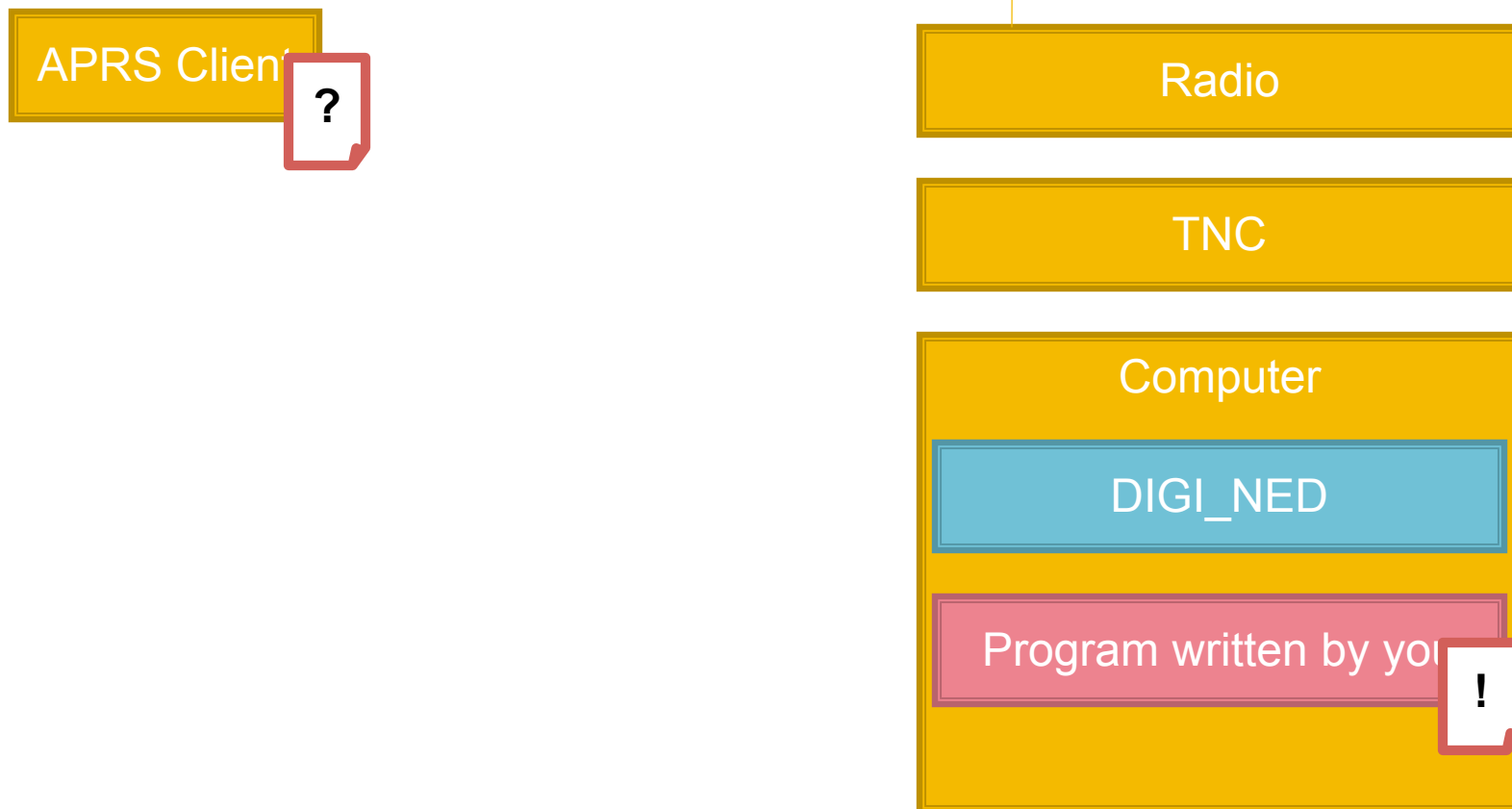
```
using System;

namespace HelloWorld
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine("hello world");
        }
    }
}
```

# Programming DIGI\_NED

- Simple pattern matching and text response
- Develop console application that accepts command line arguments and sends output to a file
- File contents output as APRS messages

# Calling a program



# User program

## Operating System

?find coffee

DIGI\_NED Process

COFFEE1

find.exe (user program)

Pos and  
query

<http://yahoo.com/search/pos&coffee>

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en-US" xml:lang="en-US">  
<ResultSet  
<Result>  
  <Title>Jitters</Title>  
</Result>  
</Results>
```

Filename: digi\_ned.mes

?find \*

!find.exe %z %q

>find.out

(file: find.out)

# Regular Expressions

- Pattern
- Describes a set of strings
- Matching and grouping
- Saves you from writing miles of parsing code yourself.
- Available in many languages and platforms
- Built into Perl syntax
- Find-U position report regex demo
- Find a real data source if you can (html/xml/web service)



# Find project

- Start by creating new console project in Visual Studio
- Define variables
- Open output file
- Validate calling arguments (`args[]`)
- Extract position and query from arguments
- Set the URL for Yahoo
- Send web request
- Read response (XML in this case)

# Find project

- Use .Net XML functions to extract data values
- Write values to output file and close it
- Test and debug your program from Visual Studio
- Add Find entry to digi\_ned.mes

```
?find *
```

```
! find.exe %z %q
```

```
>find.out
```

- Ready to run it live bahvl

# Debugging your application

- Add break-points
- Inspect variables and values
- Visualizers
- Immediate window
- Values can be changed in debugger at runtime
- Don't spam APRS - test your app "off-line"

# Possibilities are endless

- Position aware services (Yahoo demo)
- Microsoft MapPoint integration
- Connect your own database
- Find-u data
- Proximity alerts
- What are you waiting for?

# Resources

- DIGI\_NED home page:  
[http://www.qsl.net/digi\\_ned/](http://www.qsl.net/digi_ned/)
- Visual Studio Express (free download)  
<http://msdn.microsoft.com/vstudio/express/>
- .Net Framework 2.0 Software Development Kit (free download)  
<http://www.microsoft.com/downloads/details.aspx?familyid=fe6f2099-b7b4-4f47-a244-c96d69c35dec&displaylang=en>
- Regular expression designer (free download)  
<http://www.radsoftware.com.au/regexdesigner/>
- MSDN (Microsoft Developer Network)  
<http://msdn2.microsoft.com/en-us/default.aspx>
- Microsoft.Net Wiki  
[http://en.wikipedia.org/wiki/Microsoft\\_.NET\\_Framework](http://en.wikipedia.org/wiki/Microsoft_.NET_Framework)

# Resources

- DIGI\_NED Source  
[http://www.qsl.net/digi\\_ned/html/doc/d\\_n-owner-manual/d\\_n-distribution.htm](http://www.qsl.net/digi_ned/html/doc/d_n-owner-manual/d_n-distribution.htm)
- DIGI\_NED Telemetry Interface  
[http://home.arcor.de/burkhard-john/aprs\\_interface/index\\_e.html](http://home.arcor.de/burkhard-john/aprs_interface/index_e.html)
- Visual Studio Product Line Comparison  
<http://msdn2.microsoft.com/en-us/vstudio/aa700921.aspx>
- Cygwin  
<http://cygwin.com/>
- Yahoo Developer Network  
<http://developer.yahoo.com/>
- This presentation and code samples  
<http://groups.yahoo.com/group/digined/files/add-ons/DotNet/>

**Questions?**