IPRO 349: Wireless ISP and Customer Loyalty Information Technology Solutions

Advisor: Dr. David Pistrui
Assistant Advisor: Zach Hench
Mentor: Marcin Budny

Development Team
Krzsztof Drzyzdzyk
Przemyslaw Warzynski

Research and Documentation Team
Katherine Hadou
Jessica Schmit

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1.0 Revised Objectives

IPRO 349 2.1 is focused on creating a prototype of a map reporting component that will be used as an addition to the ComArch Report Book software. Report Book is a software bundle used for customized data analysis, depending on client needs. The data, both transactional and control, is formatted in an XML database. For example, it interprets data collected from transactions at stores through the register data gathered during the day, but can also help companies analyze why profit margins are different in different regions. The map reporting component will be a visual depiction of this data on a geographical map. A chart explaining exactly what the program itself does can be found in Figure 1.1.
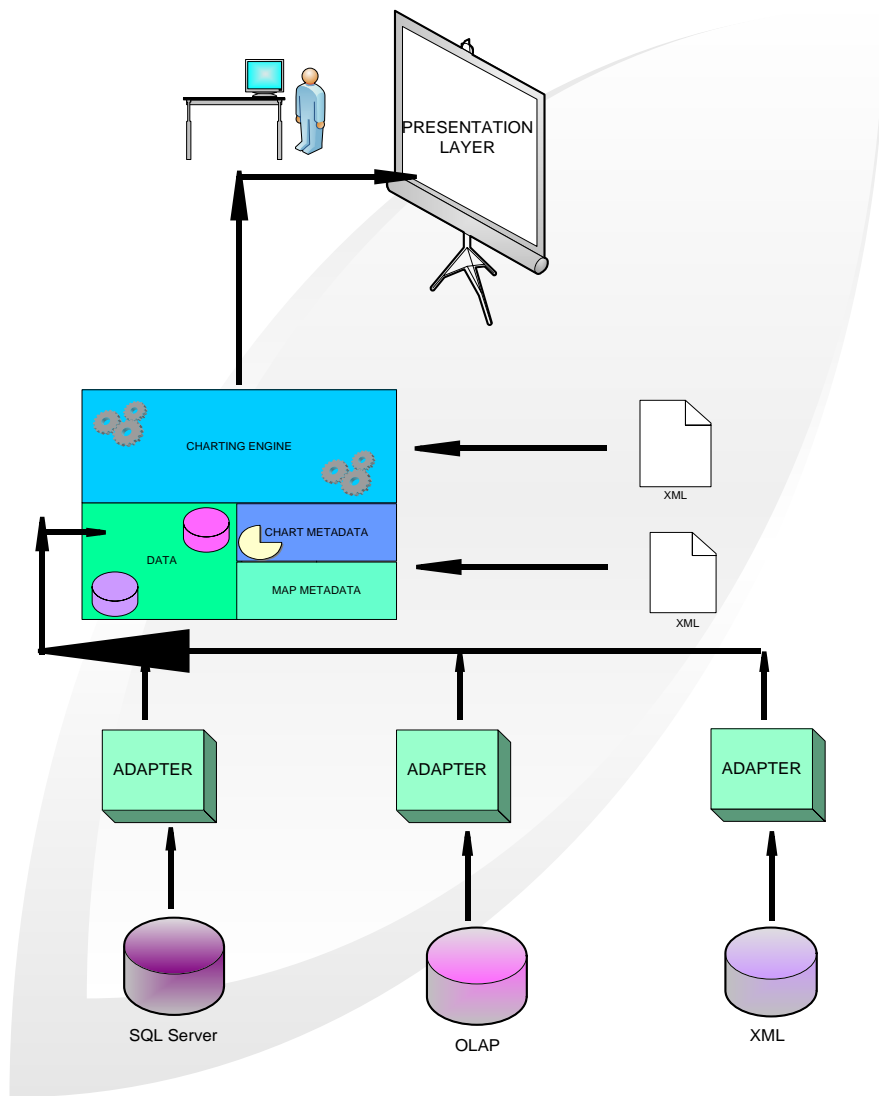

Figure 1.1 Data Conversion for Mapping Component

The map reporting component will be added to the software in order to increase the value to the client. The objectives for this group are to create this prototype and track its progress from the gathering of user requirements through the actual development of the software using IT project methodology. The methodology shows us an ideal model where none of the phases need to be repeated. In reality, however, it is expected that design, development and testing will be repeated many times before the project is actually deployed to the consumer.
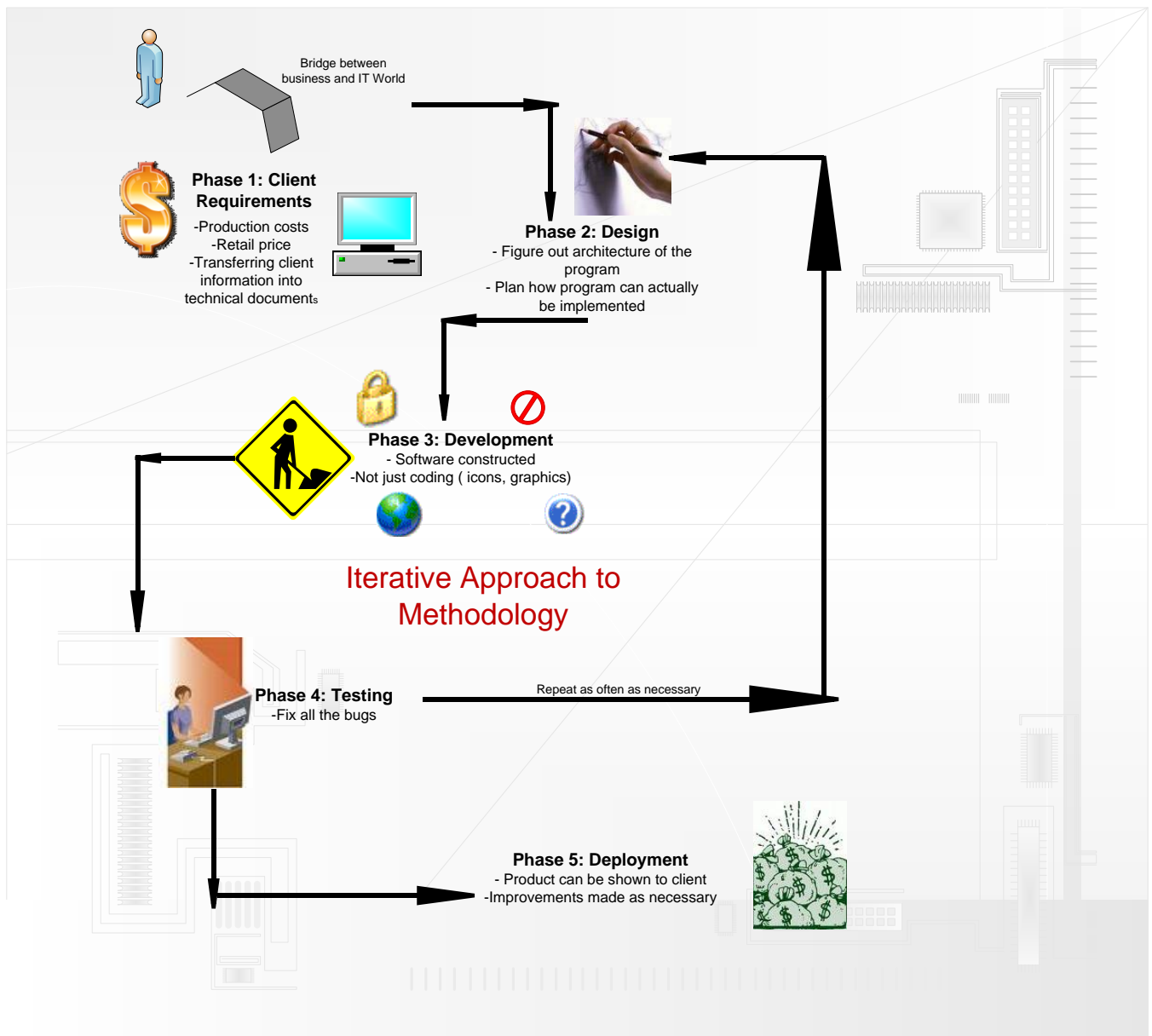
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Bridge between business and IT World

Phase 1: Client Requirements
-Production costs
-Retail price
-Transferring client information into technical documents

Phase 2: Design
- Figure out architecture of the program
- Plan how program can actually be implemented

Phase 3: Development
- Software constructed
-Not just coding (icons, graphics)

Iterative Approach to Methodology

Phase 4: Testing
-Fix all the bugs

Repeat as often as necessary

Phase 5: Deployment
- Product can be shown to client
-Improvements made as necessary

Figure 1.2 Iterative Approach to Methodology

The client will be able to analyze both transactional and control data. The team is using C# and Microsoft's .NET Framework along with Visual Studio 2005 to write the code for the actual program, as well as Visio and Inkscape to create prototype maps for the client. Figure 2.3 shows the use-case scenario showing what each participant wants from the system.
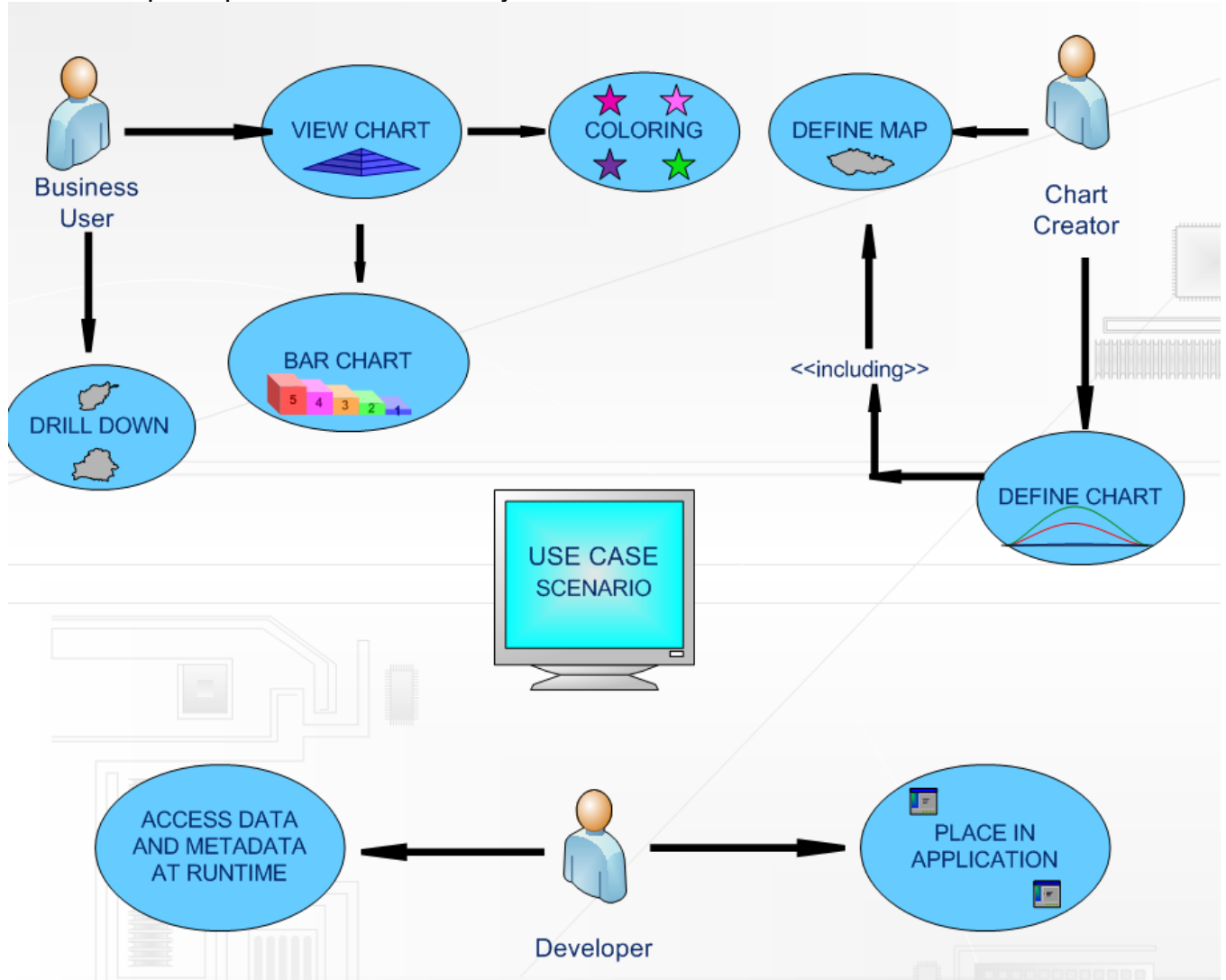

Figure 1.3 Use-case Scenario

The Development team is in charge of creating a program that will allow the user to display maps with pie charts, colors (as in winning candidate scenarios) and bar graphs. The data that is used to create these charts can come from the operator of the software, ranging from when the product arrives at the warehouse to when the product is literally scanned to be purchased. One of the main goals of the product is to provide a sense of versatility to the consumer, so that it can be used in many different ways. The maps must also provide for a drill down feature, explained further in Figure 1.4. The research and documentation team did research on the mapping components of other companies and the presentation can be seen in Appendix A, and as far as we know there have been no major attempts at creating mapping components for ComArch thus far.
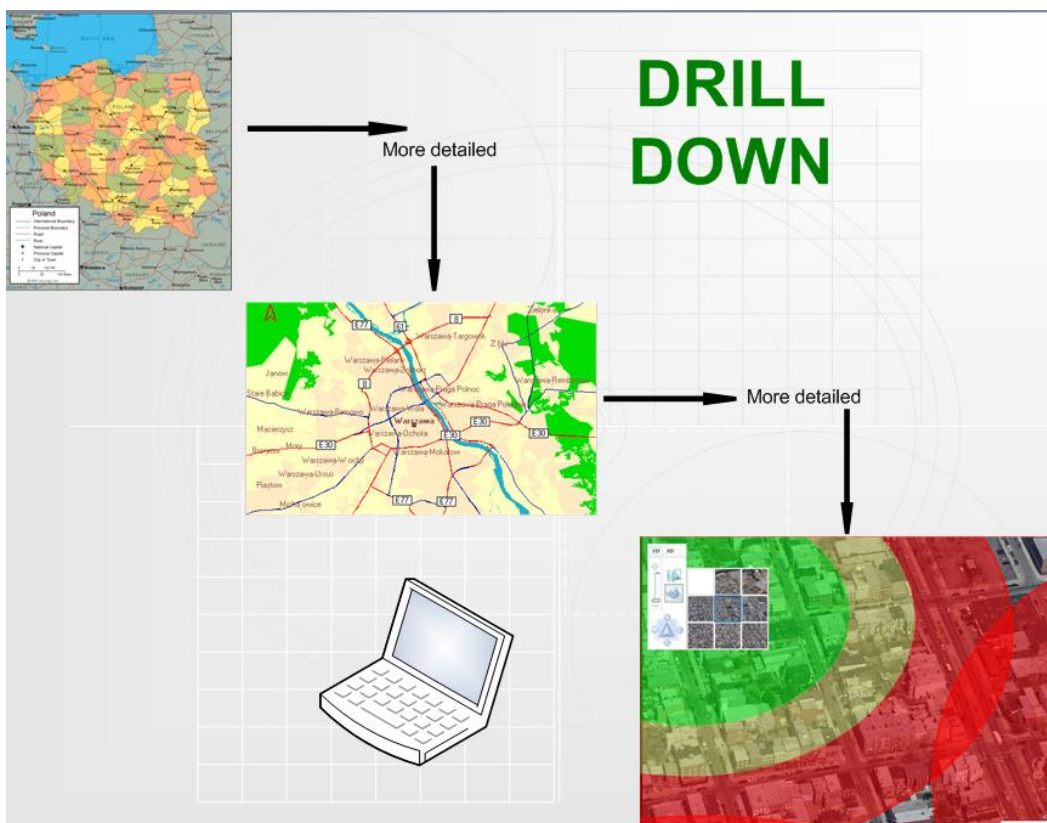

Figure 1.4 Drill Down Feature

These objectives have not changed since their original establishment in the Project Plan. The necessary tasks have been further described and distributed amongst the two sub-teams.

Development Team
- Design the concept map for general map reporting component
- Develop program prototype that is able to connect to the desired database and adapt information into a compatible form (adaptor function)
- Develop program prototype that is able to analyze and represent data in a graphic, geographic display
- Develop autonomous testing methods to insure functionality of map reporting component and utilize outputs to fix the bugs of the program

Research and Documentation Team
- Research ComArch's competitors and distinguish the advantages/ disadvantages of their programs in comparison to our mapping solution.
- Research ComArch's primary customers and ensure map reporting components functionality
- Research business aspect of marketing software and ways to improve current distribution
- Create maps of Poland using Inkscape and Visio in a wide range of details to be implemented within the program
- Document Development team's progress
- Produce method to manually test prototype to improve user-friendliness, versatility, and functionality
- Create IPRO deliverables, as well as presentations and deliverables required by ComArch

Bi-weekly meetings with Marcin Budny ensure the group maintains frequent communication and an understanding of the other members' progress.

2.0 Results to Date

Both sub-teams have been working hard to produce a functional prototype that can be easily incorporated into Report Book.

The Research and Documentation Team began by creating a summary of the functions that are included in ComArch's competitors' version of the map reporting component and presenting these finding to Marcin Budny. This presentation can be found in Appendix A. In addition to this research, they also investigated ComArch's current and potential clients in order to make Report Book more versatile and usable product. A list of marketing targets can be seen in the chart below.
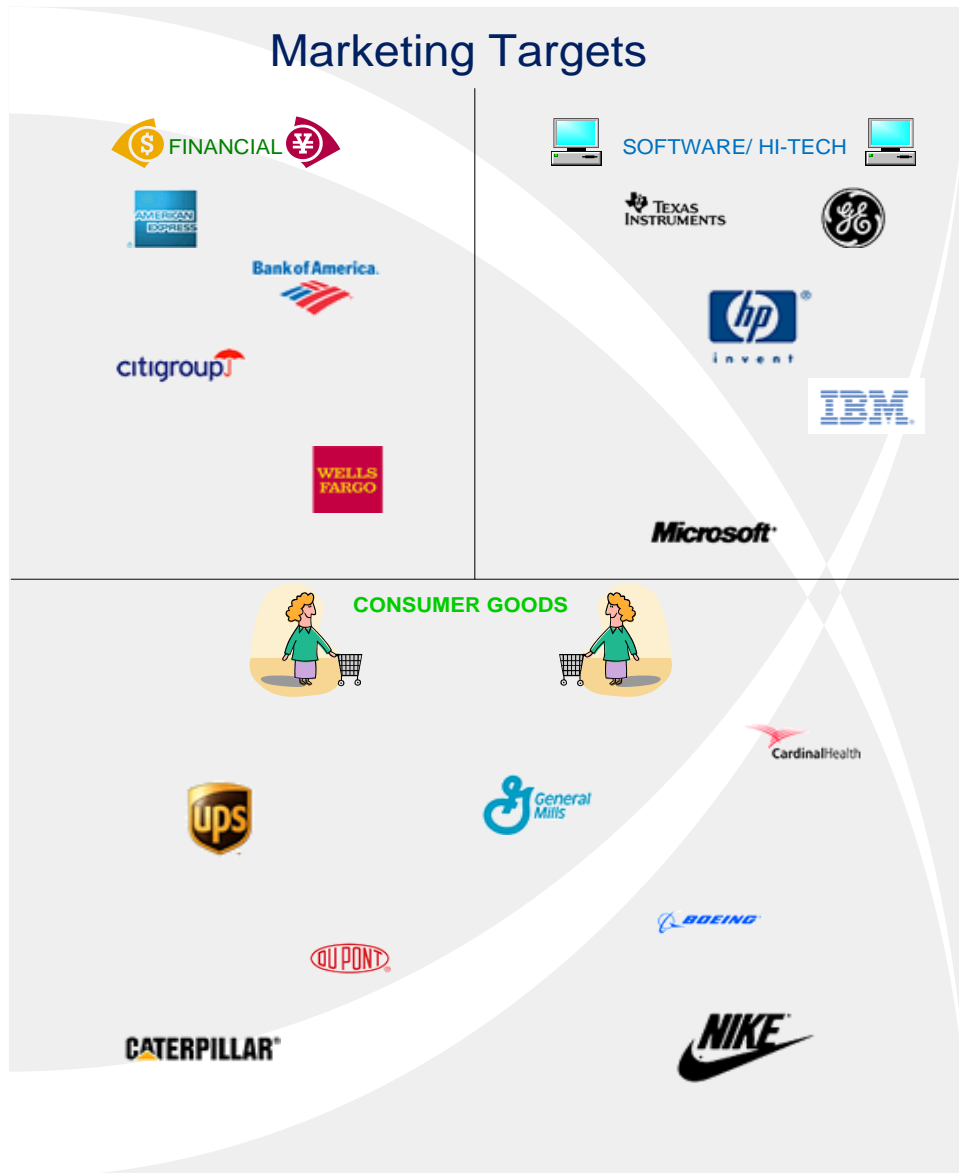
Fig. 2.1 List of Dundas Clients

      Report Book generally caters to medium-sized companies, which is defined as any business with less than 500 employees. Some of Report Book's current customers are Sokołów SA and PKM Duda. However, with the added versatility that a map reporting component would offer Report Book, it would be possible to expand to large and even Fortune 500 companies, much like Dundas.

      The Research and Documentation Team also researched the business aspect of Report Book. It is sold as a part of the CDN XL program, which ComArch does not directly sell to customers. Instead they have several hundred small companies that are referred to as partners. The partners resell CDN XL and provide users with support. A list of the top ten partners can be seen in Fig. 2.2.

Figure 2.2 Top Ten Partners of 2007

The Research and Documentation team found that CDN XL has many prominent customers, such as Lovely Look, which has become the largest full service hair salon in Poland within the last ten years. They boast about being one of the most modern Polish hairstyling sectors because of their use of CDN XL. They attribute it as the best way to "better monitor the activities in the salons, cut the costs of accounting, and improve direct marketing with regular customers." With such great buzz surrounding CDN XL, Report Book is guaranteed to become one of the most successful analytical programs on the market. ComArch makes revenues by obtaining licenses for programs like CDN XL and offers customization of programs for concrete clients.

The Research and Documentation Team learned the client requirements from Marcin Budny, which showed that the map reporting component will be an addition to the Comarch Report Book already in use. Using current maps of Poland, they have used Inkscape to create much more detailed maps that will be integrated into the map reporting function. An example section of counties in the Malopolskie region can be seen in Figure 2.3.

Figure 2.4 Example of Mapping

They have also produced the Project Plan. In order to illustrate the team's plan on how to achieve completion of the prototype, it was necessary to learn how to use vector graphics programs, such as Inkscape and Visio.

The Development team has created a concept map to plan out the overall architecture of the program, and a simplified version can be seen below in Figure 2.5. The team split the work into two portions: the charting engine and the presentation layer. The charting engine takes XML chart metadata and converts it into the object model, then loads the data from the database through an adaptor. Finally, it associates the regions with their corresponding data. The presentation layer takes the products of the charting engine and displays the actual charts. An example of map created by the prototype can be seen in Fig. 2.5
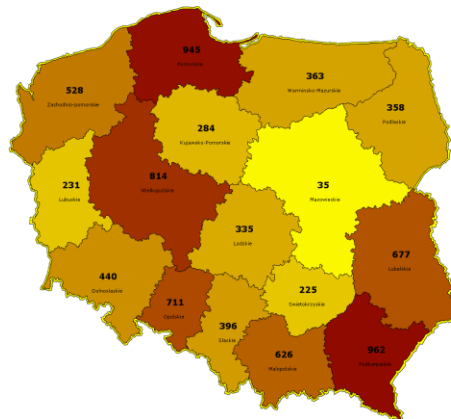
Figure 2.5 Example of Map Reporting Chart

The program structure developed by the Development team can be seen in Figure 2.6. The team learned to adapt their skills with Java and C++ to C# and Microsoft's.NET Framework along with Visual Studio 2005 with the help of a 3-day tutorial. Sample code can be found in Appendix B.
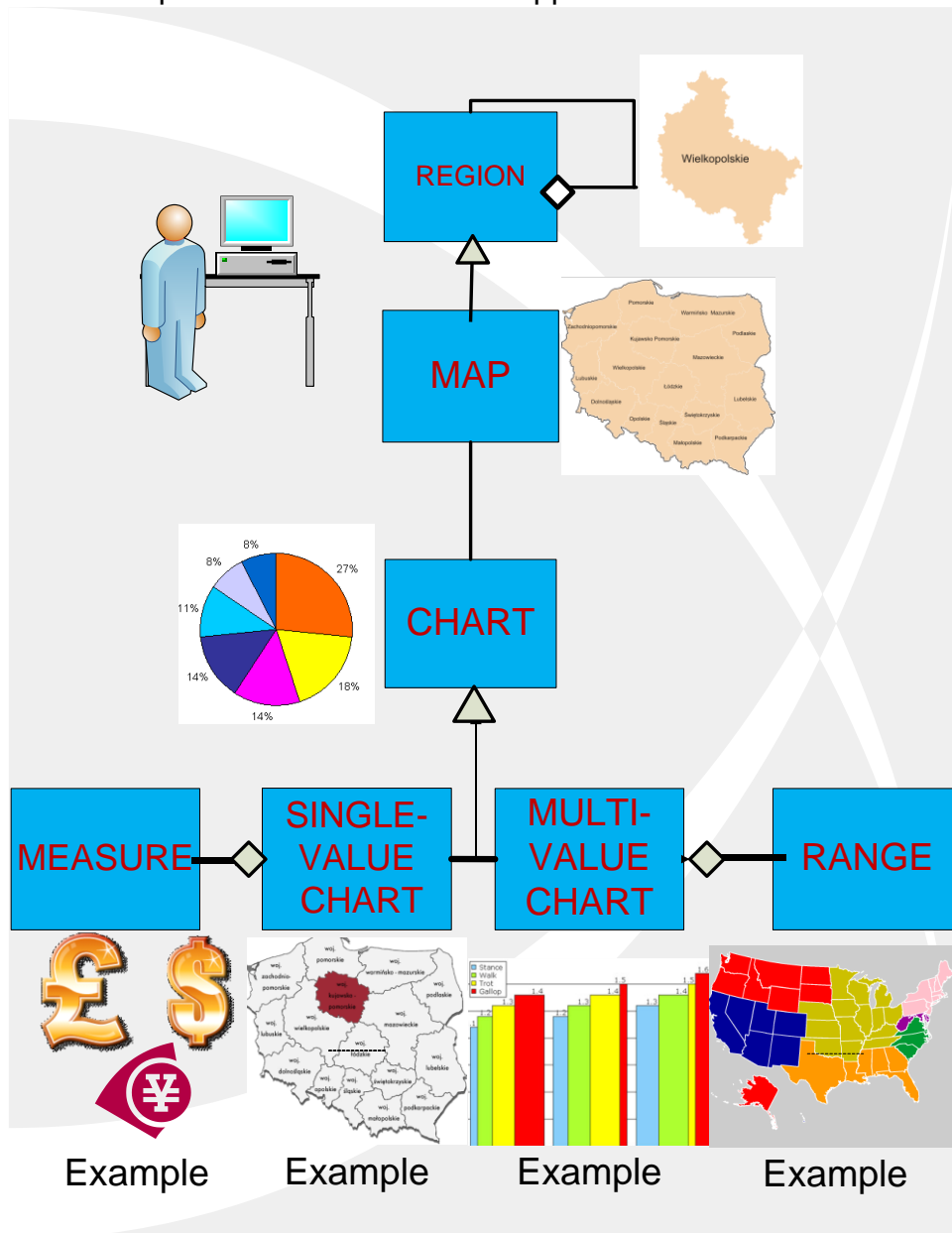
Figure 2.6 Program Structure
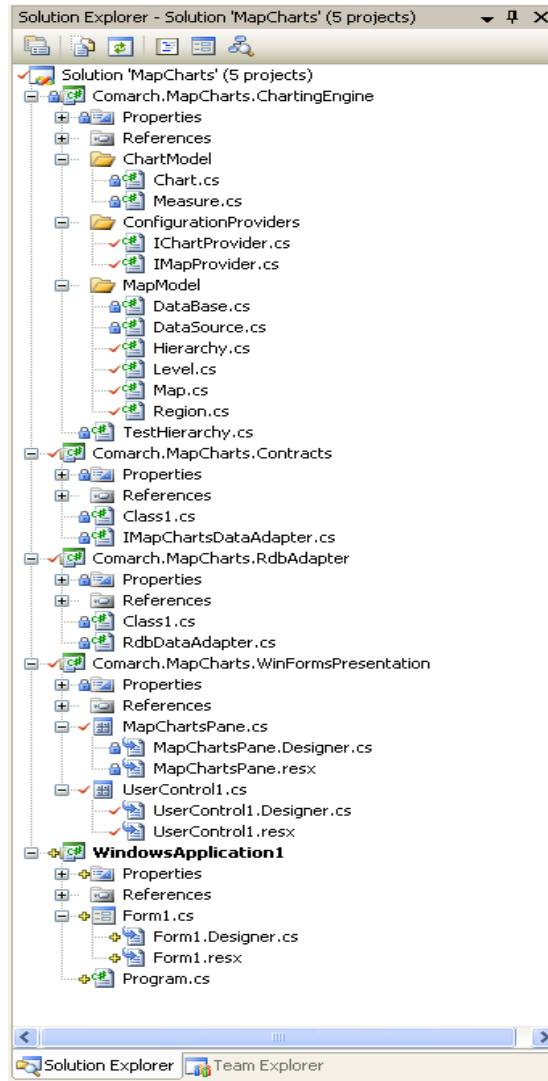
Figure 2.7 Program Structure and Code Files

As a team, there have been several productive meetings with David Pistrui, ranging from rapid prototyping exercises to team bonding activities. After his departure from Poland, the team routinely keeps up with David Pistrui with weekly conference calls. In addition to building a good team dynamic, each member has written a reflection of the past week, as well as keeping a personal journal.

The development team will be able to combine the two segments of the program to work together and create a working prototype. This will then be autonomously tested by the Development Team and manually tested by the Research and Documentation Team. These scenarios are being developed. If this testing does not produce the desired chart, the code will be re-evaluated and corrected.

Currently, a working prototype is under production and will not be delivered to ComArch upon the midterm. However, the business research the group has accomplished will benefit not only the map reporting component, but also Report Book as a whole.

3.0 Revised Task/ Event Schedule

Task	Assigned To	Due By	Assigned To	Skills/ Education Necessary	Hours
Meetings	Marcin Budny	Throughout	Marcin Budny	Management and Communication Skills	3
Programming Prototype	Development Team	Throughout	Development Team	Computer Science Background, Knowledge of C # and .NET	120
Project Plan	Research and Documentation Team	June 26, 2007	Research and Documentation Team	Proficient with Microsoft Word and Visio	20
Concept Chart of Program	Development Team	July 5, 2007	Development Team	Computer Science Background	2
Midterm Report	Research and Documentation Team	July 6, 2007	Research and Documentation Team	Proficient with Microsoft Word and Visio	20
Drill-Down Version of Maps	Research and Documentation Team	July 19,2007	Research and Documentation Team	Proficient with Microsoft Visio and Inkscape	60
Final Prototype	Development Team	Jul 20, 2007	Development Team	Computer Science Background, Knowledge of C# and .NET	200
Exhibit/Poster	Research and Documentation Team	July 23, 2007	Research and Documentation Team	Proficient with Microsoft Word and Visio and Adobe Photoshop	10
Abstract/ Brochure	Research and Documentation Team	July 24, 2007	Research and Documentation Team	Proficient with Microsoft Word and Visio and Adobe Photoshop	10
Presentation	Research and Documentation Team And Development Team	July 24, 2007	Research and Documentation Team And Development Team	Public Speaking Skills	20
Final Report	Research and Documentation Team	July 25, 2007	Research and Documentation Team	Proficient with Microsoft Word and Visio	20
Meeting Minutes	Research and Documentation Team	July 25, 2007	Research and Documentation Team	Proficient with Microsoft Word	2
CD of Deliverables	Research and Documentation Team And Development Team	July 27, 2007	Research and Documentation Team And Development Team	Proficient with Microsoft Word	1
IPRO Day	2 presenters (1 AGH, 1 IIT), TBD	July 27, 2007	2 presenters (1 AGH, 1 IIT), TBD	Public Speaking Skills	1

The team decided to set dates for the necessary milestones of the project, to insure the group stays on target, considering they only have 6 weeks to complete a complex program. The team set dates for when the concept chart, different versions of the maps, and prototypes should be tentatively completed. This will allow ample time to correct mistakes and become comfortable with the final products.

The team has two weekly meetings with Marcin Budny to establish a good communication flow and to help the team stay on track. The team has accomplished all of the current goals to date, including the concept map, Project Plan, and the Midterm Report. These will serve as the foundation of the rest of our project.

4.0 Changes in Task Assignments and Designation of Roles and Team Organization

Name	School	Major	Sub-Team	Skill Set
Krzysztof Drzyzdzyk	AGH	Applied Computer Science	Development	English, Microsoft fluency, typing skills, C++, C, Java, ADA
Katherine Hadou	IIT	Biology Biochemistry and Premed Focus Music Minor	Research and Documentation	Typing and research skills, Microsoft fluency, Polish fluency, communication skills, IPRO experience, helps parents run small business
Jessica Schmit	IIT	Biology Psychology Premed Focus	Research and Documentation	Typing skills, Dreamweaver, 3DMax, Microsoft fluency
Przemyslaw Warzynski	AGH	Computer Science	Development	English, Java, Eiffel, C++, Microsoft fluency, some graphic design experience, typing skills

Team Leader/Mentor: Marcin Budny

Because our sub-teams have only two members each, we decided that sub-team leaders would be unnecessary. The research and documentation team is in charge of doing any research required for this project, such as what ComArch already has in place regarding mapping components and what other companies have in place. They will also be in charge of all documentation that IPRO and ComArch require for the team. Finally, the research and documentation team will create a sample map using Visio and Inkscape. The development team will use C# and create the actual prototype mapping component.

Theses sub-teams have not changed, as certain educational requirements are needed for each group. The Development team has a firm grasp on computer science skills and is able to utilize C# and .NET. The Research and Development team are fluent in English and are more business-oriented.

5.0. Barriers and Obstacles

One of the main problems facing the group is the language barrier. Although we have one IIT student who speaks fluent Polish, some technical explanations take quite a while to be understood by both subgroups. The Polish team members practice their English frequently and communication becomes easier every day. Another problem the team faces is that the developers have never used C# before. As a result, they have had to have a "crash course" in programming with it, but their backgrounds in Java and C++ have helped them understand and use the new programming language. Finally, the team has the problem that the research and documentation team have no programming experience, and very limited graphic design experience. They have overcome that problem by asking their supervisors and colleagues for help whenever they need it and playing around with the Visio and Inkscape programs to find new tricks and features.

The Development team is currently having problems while testing the display of the maps. Although the code produces maps, they have errant lines in them, shown in Figure 5.1, which need to be fixed before the prototype can be functional. Marcin Budny is working closely with them to try to rectify this problem.
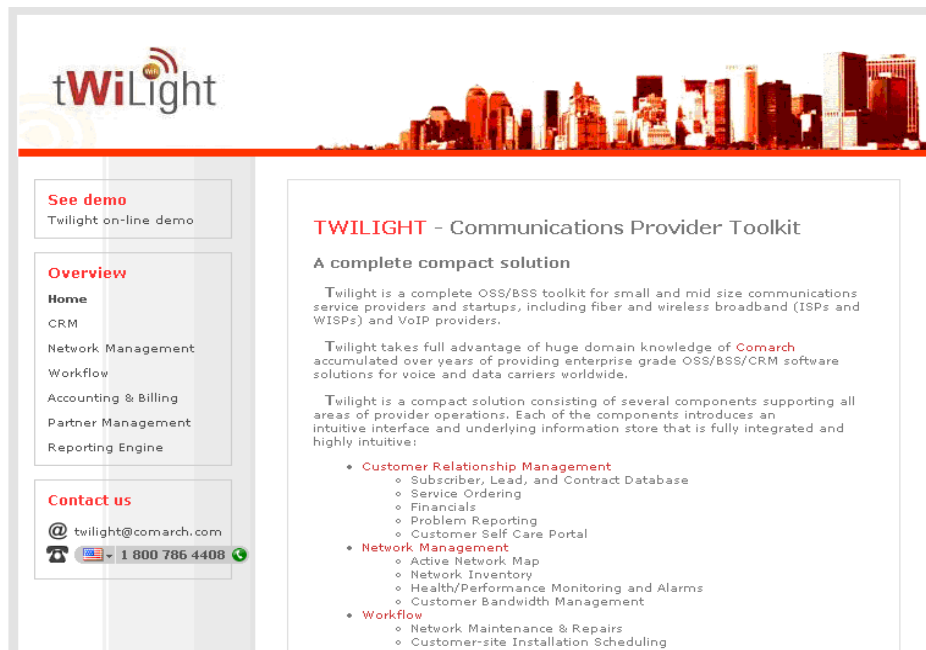
Figure 5.1 Map Error

Figure 5.2 Correct Map

Appendix A

Headquarters: Krakow, Poland

Faults:
Not eye-catching
Organized
Not quite enough information
Somewhat confusing for small business owners without computer gurus on staff
Ambiguous descriptions
No specific section for map reporting component
No price range
DOES NOT SHOW UP ON GOOGLE SEARCH!

Features:
AMAZING DEMO
Automatic SNMP topology discovery
Logical network map, with the visualization of network equipment status
Geographical base system coverage map
    Integrated state and performance information
Map is more detailed, animated
Device inventory performance monitoring
    Including trends and thresholds
Network related tasks scheduling and monitoring
Real view map, coordinate plane
More offered than with any other company

Faults:
Simplistic
Versatility is questionable
24-hour support only through email
No packages

Features:
CHEAP - $199
Chart options for map, wide-range resolution support, custom background
VERY user-friendly, colorful, catchy
        Today's Tip of the Day from Dr. Presentation
Minimal effort, no installation needed (smartCh@rt technology),
        cut and paste from Excel
Direct support for Oracle, Microsoft SQL, MS Access (MDB) and
        ODBC database loading
Supports JPEG, TIFF, PNG, BMP, WMF and GIF image formats
        AVI movie format
Language options, map options
Free, unlimited, 24-hour support
Zip-compression of charts
Direct email attachment
Home page includes:
        Buy Now link, Guide link
        Key features
        Top reasons to buy
        Examples, tips

Headquarters: Sacramento, California, USA

Faults:
AWFUL DEMO
Extension Pack
A lot of information needs to be downloaded

Features:
Information downloads provided
Most maps available
Price: $1499
        Extension to ChartFX - $2699
FLEXIBLE!
        Not just geographic maps

Headquarters: Toronto, Ontario, Canada

Faults:
Lengthy tutorial
	Not hands-on
Predefined maps from library

Features:
Appears on all pertinent Google Searches
Cost - $699
Informative tutorial
Built-in panning and zooming
World and continent maps
Predefined maps from library
Serialize maps as XML or binary
Symbols/pictures attached to all/some layers
Distance scale/legend/color configuration

Headquarters: Toronto, Ontario, Canada

Faults:
Lengthy tutorial
    Not hands-on
Predefined maps from library

Features:
Appears on all pertinent Google Searches
Cost - $699
Informative tutorial
Built-in panning and zooming
World and continent maps
Predefined maps from library
Serialize maps as XML or binary
Symbols/pictures attached to all/some layers
Distance scale/legend/color configuration

PODhoc Reporting

Comprehensive Ad Hoc Reporting Tool

Starting with the pivot table field list, the number of clients and visits to public health offices were dragged and dropped into the pivot view, generating a chart view that provides a breakout by gender and visits. The map view (available with the GIS version of PODhoc Reporting) dynamically updates for each selected cell in the pivot view showing the geographic disbursement of clients across the state.
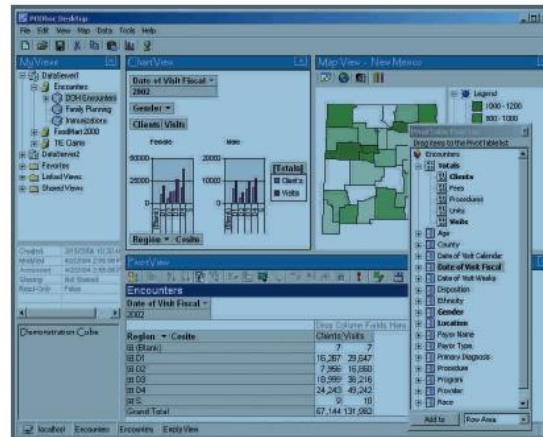
How does it work?

All data in a database or series of databases can be connected to a data cube for ad hoc reporting. Then users with privileges to a particular cube can drag and

Headquarters: Albuquerque, New Mexico

Faults:
Requires a LOT of extra software
No links on the site; long and lengthy
No demo

Features:
Uses OLAP technology and supports all ODBC compliant data sources
Integrated with Microsoft Office and paste graphs directly, export data from Excel
Drag and drop data elements
Real time GIS data mapping provides visualization
Creates new elements without touching the data source
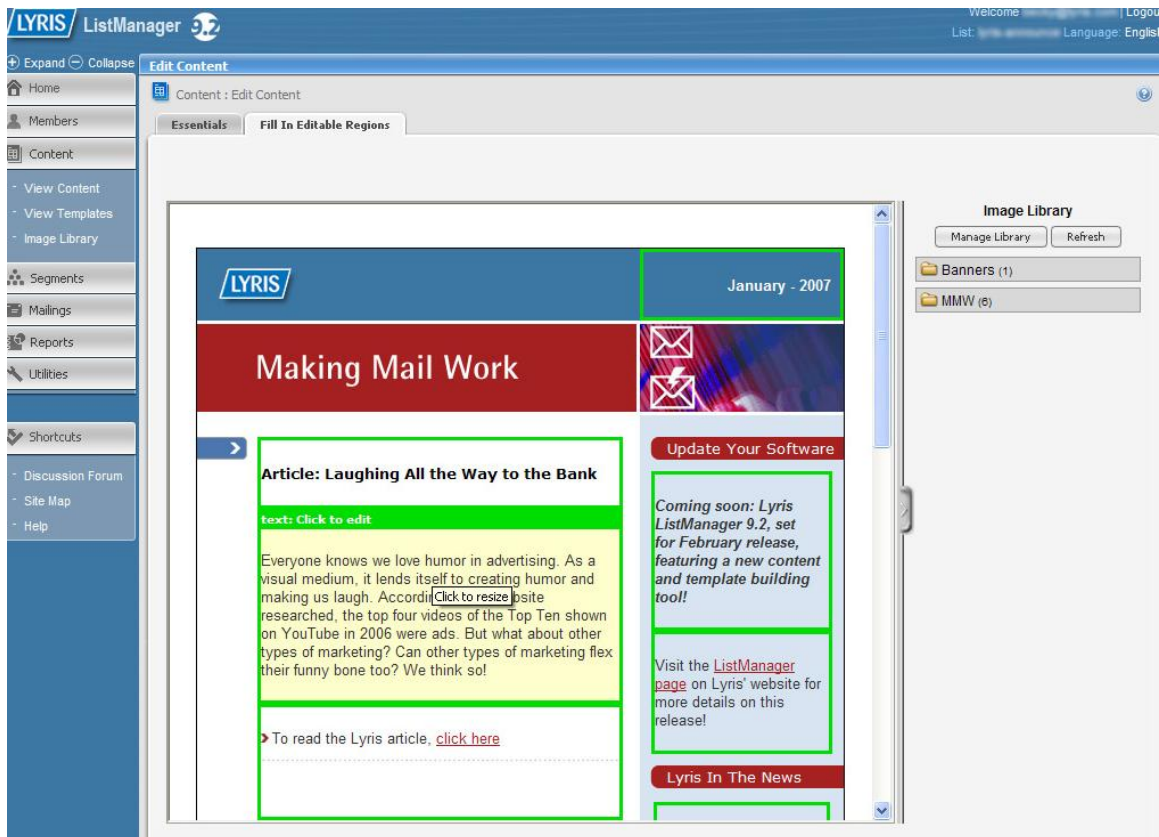
Headquarters: Emeryville, California

Faults:
Customer representatives must call to use demo
Exclusively used for tracking email campaigns, newsletters and discussion groups
Powered by Yahoo Maps
Only have maps from the United States

Features:
Very cheap (starting at $675)
Free downloads for up to 200 people
HTML editor
Large Image Library, with drag and drop simplicity

Headquarters: Emeryville, CA

Faults:
Minimal cost is $10,350
$50 minimum for support
Cannot import from Excel directly
Very technical website

Features:
Supports custom grouping and multiple group levels
Binds more data sources than any other grid (jagged arrays, ILists, IListSouces)
Unlimited-size fixed header and footer regions that versatile
Lots of VB.NET and C# samples

Headquarters: McLean, Virginia

Faults:
Relatively pricy
Very long tutorial, without any "do-it-yourself" usability
Website is bland
Minimal of $749 for year-long of support
$300 2 hours training session
Requires Microsoft Analysis Service
Relatively expensive ($5,000 per processor)

Features:
User-friendly website
Versatility (allows you to adjust cube dimension and measure selections)
Wide variety of standard charts
Animated flash charts
Imports data directly from Excel
Able to create into PDF

Appendix B

```csharp
        public static SVGRectangle Parse(XmlNode node)
        {
            SVGRectangle rect=new SVGRectangle();
            rect.X=float.Parse(node.Attributes["x"].Value);
            rect.Y=float.Parse(node.Attributes["y"].Value);
            rect.width=float.Parse(node.Attributes["width"].Value);
            rect.height = float.Parse(node.Attributes["height"].Value);
            rect.style =
SVGStyle.ParseStyle(node.Attributes["style"].Value);
            return rect;
        }

        public void Translate(float dx, float dy)
        {
            X += dx; Y += dy;
        }
    }

    //class SVGCircle
    public class SVGCircle : SVGShape
    {
        public float Cx
        {
            get { return X; }
            set { X = value; }
        }
        public float Cy
        {
            get { return Y; }
            set { Y = value; }
        }

        private float r;
        public float R
        {
            get { return r; }
            set { r = value; }
        }

        private SVGStyle style;
        public SVGStyle Style
        {
            get { return style; }
            set { style = value; }
        }

        public SVGCircle()
        {
            r = 0.0F;
        }

        public static SVGCircle Parse(XmlNode node)
        {
```

```csharp
            SVGCircle circle = new SVGCircle();
            String s = "";
            foreach (XmlAttribute attr in node.Attributes)
                s += attr.Name + ":" + attr.Value + ";";
            circle.style = SVGStyle.ParseStyle(s);
            circle.Cx = float.Parse(node.Attributes["cx"].Value);
            circle.Cy = float.Parse(node.Attributes["cy"].Value);
            circle.r = float.Parse(node.Attributes["r"].Value);
            return circle;
        }

        public void Draw(Graphics g)
        {
            if (style.IsFilled)
                g.FillEllipse(new SolidBrush(style.FillColor), Cx - (r
- style.StrokeWidth / 2), Cy - (r - style.StrokeWidth / 2), 2 * (r -
style.StrokeWidth / 2), 2 * (r - style.StrokeWidth / 2));

            g.DrawEllipse(new Pen(style.StrokeColor,
style.StrokeWidth), Cx - r, Cy - r, 2 * r, 2 * r);
        }

        public void Translate(float dx, float dy)
        {
            X += dx; Y += dy;
        }
    }



        public static SVGLine Parse(XmlNode node)
        {
            SVGLine el = new SVGLine();
            el.style =
SVGStyle.ParseStyle(node.Attributes["style"].Value);
            el.X1 = float.Parse(node.Attributes["x1"].Value);
            el.Y1 = float.Parse(node.Attributes["y1"].Value);
            el.X2 = float.Parse(node.Attributes["x2"].Value);
            el.Y2 = float.Parse(node.Attributes["y2"].Value);
            return el;
        }

        public void Draw(Graphics g)
        {
            g.DrawLine(new Pen(style.StrokeColor, style.StrokeWidth),
X1, Y1, X2, Y2);
        }

        public void Translate(float dx, float dy)
        {
            X1 += dx; Y1 += dy;
            X2 += dx; Y2 += dy;
        }
    }

    //class SVGEllipse
    public class SVGEllipse : SVGShape
```

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