

### A BRIEF INTRODUCTION



The basic GUI-Components in Windows Forms, WPF, and ASP.NET are often kept too simple and sometimes lack power. As soon as Microsoft has created a set of GUI-Controls for a User Interface Technology, they won't be extended any more. Since the dawn of the PC, that's the reason why third parties offer comprehensive and simply better .NET-Controls.

We'll examine GUI-Suites of different producers and how they deal with popular problems either more or less elegant. For example:

- Is it possible to present one million rows fast and fluid?
- How to arrange forms as fast a possible?
- Is it possible to prevent applications from freezing in a simple way?
- Can a Combobox be extended with more information?
- Can we provide a search on multiple fields without extra programming?



### **GUI-CONTROL-SUITE PRODUCERS**

(A-Z)

actipro www.actiprosoftware.com	DevExpress www.devexpress.com	GrapeCity / ComponentOne www.grapecity.com CrapeCity. ComponentOne	INFRAGISTICS www.infragistics.com
Nevron	Syncfusion	Progress / Telerik	Xceed
www.nevron.com	www.syncfusion.com	www.telerik.com	www.xceed.com

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### O THE WPF-DATAGRID

### DAS WPF-DATAGRID

No	First Name	Last Name	Date of Birth	
1	Mr.	.NET	01.01.2001	
2	Mrs.	Millenium	01.01.2000	

#### Facts:

- The Datagrid presents the most information out from a list. It's essential for Business Applications – and one of the most complex Controls!
- In the initial version of WPF, there was no DataGrid at all Statement: Use a ListView... What to do, if that's not sufficient enough? Finally the DataGrid has been added at a later point...
- Even in 2017(!) WPF-DataGrid is still being updated by Third Parties (e.g. performance optimizations)
- Many Third Party DataGrid architectures were not powerful enough, so that in the meantime there are multiple DataGrid-Controls offered by a single producer!



### **PROBLEM:** WPF-DATAGRID PERFORMANCE

A famous example:

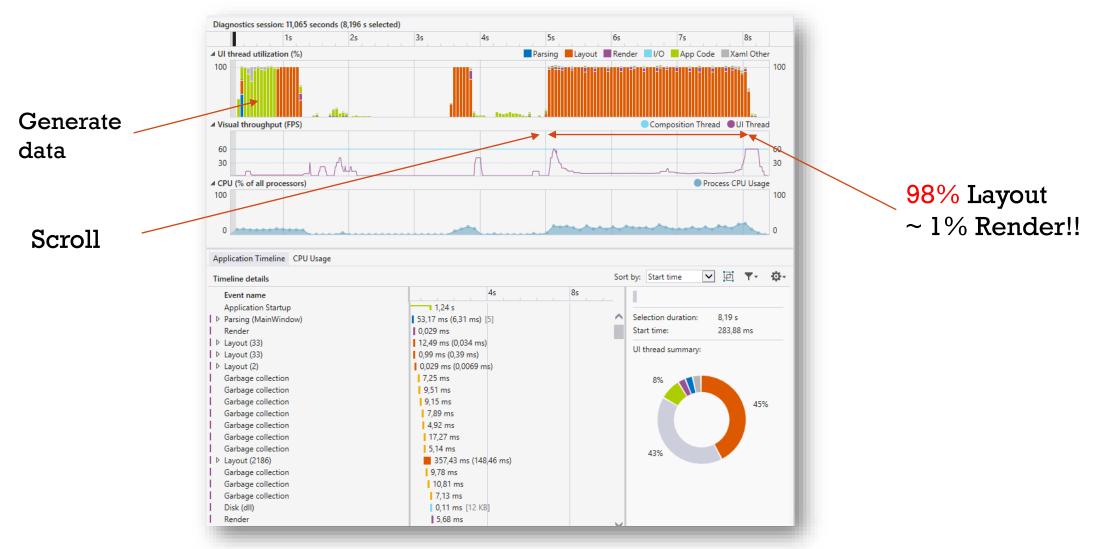
- 1. Start a new WPF-Project
- 2. Add a DataGrid
- 3. Load 2,000 Objects with 20 colums
- 4. Scroll the Scrollbar up and down

Nummer	String1	String2	String3	Preis	IsTrue	String4	String5
1	String 1	012345678910111213141516171	0,621631760439664-0,870251818499645	291.01		String 1	012345678910
2	String 2	012345678	0,373336678079021-0,917082117366177	566.53		String 2	012345678
3	String 3	012345678910111213141516171	0,584165975723493-0,0240762797296402	80.56		String 3	012345678910
4	String 4	012345678910111213141516171	0,106324951213936-0,815570040054419	711.81		String 4	012345678910
5	String 5	012345678910111213141516171	0,985320804633815-0,278246732092577	719.28		String 5	012345678910
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8	String 8	012345678910111213141516171	0,0370554635473785-0,382227954167047	887.74		String 8	012345678910
9	String 9	012345678910111213141516171	0,454944455276683-0,989851186978561	404.30		String 9	012345678910
10	String 10	012345678910111213141516171	0,381725168964698-0,316542762944728	741.14		String 10	012345678910
11	String 11	012345678910111213141516171	0,455491341396929-0,547984961209812	986.93		String 11	012345678910
12	String 12	01234567891011	0,343385028347087-0,150975464913517	484.25		String 12	012345678910
13	String 13	0123456	0,480523117110377-0,669235564148629	426.33		String 13	0123456
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15	String 15	012345678910111213141516171	0,724096997046888-0,927829612012873	819.98		String 15	012345678910
16	String 16	01234567891011	0,995469617655254-0,873951618035301	561.69		String 16	012345678910
17	String 17	0123456789101112131415	0,90221013217336-0,151675490267424	552.03		String 17	012345678910
18	String 18	012345678910111213141516171	0,488057626172927-0,326958968922011	842.42		String 18	012345678910
19	String 19	012345678910111213141516171	0,886079998633862-0,897981288795351	948.76	V	String 19	012345678910
20	String 20	012345678910111213141516171	0,785708891128054-0,563520616182834	991.23		String 20	012345678910
21	String 21	012345678910111213141516171	0,538146948226796-0,438258168025994	564.03		String 21	012345678910

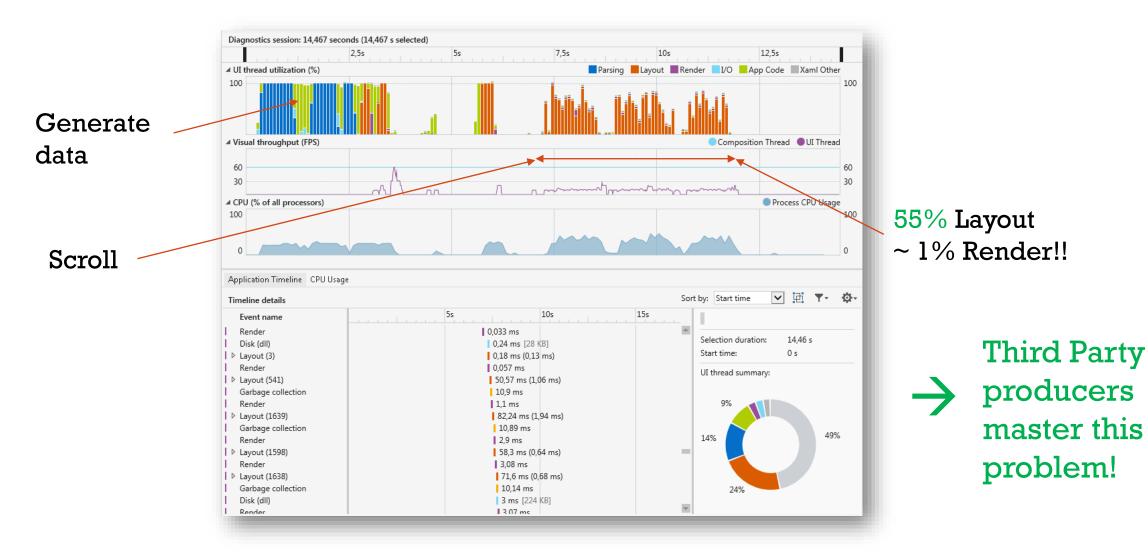
 $\rightarrow$ The DataGrid is slow, lags, and has delays, untill you see your target rows!



### **ANALYSIS: WPF STANDARD DATAGRID PERFORMANCE**



### **ANALYSIS: WPF THIRD PARTY DATAGRID PERFORMANCE**





### UUI-UUNULFI- & WPF-PROBLENS

MORF POPULAR GUI-CONCEPT- &

### **PROBLEM:** NUMBER-TEXTBOX

A TextBox has to be restricted to accept only Integers.

Common approach:

- a) Implement IDataErrorInfo to generate warnings.
- b) Host a System.Windows.Forms.MaskedTextBox with WindowsFormsHost. (also possible with a Windows Forms TextBox! BUT: Invalid Input in combination with DataBinding don't let you leave the field!)

#### → Third Party solution: **MaskedTextBox** or **typed TextBox**.

Read data type or DataAnnotation to provide the best Control.



### PROBLEM: FLEXIBLE SEARCH IN DATAGRID

We need a basic search for all fields in a DataGrid.

Common approach:

- a) Develop the whole search form by yourself.
- b) Provide some fields with limited search options.

 $\rightarrow$  Third Party solution: **Automatically integrated filter in the DataGrid** An Excel-like filter could be shown up because of the data type.



### **PROBLEM: COMBOBOX LACKING INFORMATION**

A ComboBox offers not enough information to find the right data row quickly. For example at the form: Order-ComboBox: Employee (FirstName, LastName, No, ...)

Common approach:

- a) Remain at the default ComboBox
- b) Develop multi-column ComboBoxes including a search box by yourself
- c) Switch to a subform to view depending data

#### → Third Party solution: **Lookup-ComboBox**

Configurable custom Control with integrated DataGrid.



### **PROBLEM:** FORMULAR LAYOUTING

Place 20 fields on a detail form carefully one aside each other!

```
Eabel 1 - Textbox 1
Eabel 2 - Textbox 2
Label 3 -Textbox3
```

Common approach:

- a) Arrange fields with the Visual Studio-Designer snapping function.
- b) Generate a Grid Container with two columns and place a Control in each row.

#### → Third Party solution: Form-Layout-Manager

Labels and Controls have to be added consecutively, so the position will be set automatically.



### **PROBLEM:** APPLICATION FREEZES

😕 Long running code in UI-Thread blocks the GUI. The application freezes.

Common approach:

- a) Background-Worker
- b) Threads and SynchronizationContext
- c) use async-await

What most developers forget- UI feedback!

→Loading Data...

→65% completed

#### → Third Party solution: **Progress-Indicator-Control**

Control cross-fades everything and shows animated feedback – so the application runs smoothly.



### **PROBLEM:** APPEALING, EXTRAORDINARY DESIGN

😕 Many developers aren't able to build a beautiful Design.

Common approach:

- a) Design? Don't care for it anyway!
- b) Try and fail.
- c) Use Frameworks with design included

#### → Third Party solution: **Theming**

- PROBLEM: Not all developers can provide 100% Theming!
   SOLUTION: Crucial Point: The Window it has to be changed to an custom Window, but it isn`t offered by all producers.
- PROBLEM: Not all producers offer all Controls! (e.g. Label, TreeView, etc.)
   SOLUTION: All producers overwrite the style of WPF standard controls with Theming.
- PROBLEM: Some particular standard designs are delivered, but can't be customized.
   SOLUTION: Custom Theming can be accomplished by inhouse Tools. But they are not supported by all producers.



### **PROBLEM:** APPEALING, EXTRAORDINARY DESIGN

Producer	Window-Theming	Standard-Controls- Theming	Custom Theming
actipro	-	-	-
DevExpress	X	X	X (DevExpress WPF Theme Designer)
GrapeCity / ComponentOne	-	X	O (Microsoft Expression Blend)
INFRAGISTICS	-	X	O (Microsoft Expression Blend)
Nevron	-	X	-
Syncfusion	X	X	X (Syncfusion Theme Studio)
<b>Progr</b> ess / Telerik	O (no standard Window, just modal one)	X	X (Telerik Color Theme Generator)
Xceed	-	?	-





# COMPARING APPLICATION NORTHWIND GUI

### STANDARD-CONTROLS

Compare of the Controls by use of the WPF demo application: **NorthwindGUI** 

Basic requirements:

- Load data from the database
- TreeView of Employees with Filtering in the DataGrid
- Displaying of Orders in the DataGrid (830 rows) including TemplateColumn
- Double click on a row opens detail view
- Detail view with DatePicker, ComboBox, ComboBox with Template and sub table

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▲ Westboro				EmployeeID		RequiredDate	Shippe	$\checkmark$	
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Bedford	00	10249	TOMSP	6	7/5/1996 12:00:00 AM	8/16/1996 12:00:00 AM	7/10/1		DataGrid
Georgetow	00	10250	HANAR	4	7/8/1996 12:00:00 AM	8/5/1996 12:00:00 AM	7/12/1		Grid
Boston	00	10251	VICTE	3	7/8/1996 12:00:00 AM	8/5/1996 12:00:00 AM	7/15/1		
Cambridge Braintree	00	10252	SUPRD	4	7/9/1996 12:00:00 AM	8/6/1996 12:00:00 AM	7/11/1	<u></u>	Image
Providence	00	10253	HANAR	3	7/10/1996 12:00:00 AM		7/16/1	A	Label
Wilton	00	10254	CHOPS	5	7/11/1996 12:00:00 AM		7/23/1	<b>E</b>	ListBox
Morristown	00	10255	RICSU	9	7/12/1996 12:00:00 AM	8/9/1996 12:00:00 AM	7/15/1		
Edison	00	10256	WELLI	3	7/15/1996 12:00:00 AM		7/17/1	0	RadioButton
New York	00	10257	HILAA	4	7/16/1996 12:00:00 AM	8/13/1996 12:00:00 AM	7/22/1		Rectangle
<ul> <li>New York</li> <li>Mellvile</li> </ul>	00	10258	ERNSH	1	7/17/1996 12:00:00 AM		7/23/1	目	StackPanel
Fairport	00	10259	CENTC	4	7/18/1996 12:00:00 AM	8/15/1996 12:00:00 AM	7/25/1		
Neward	OC	10260	OTTIK	4	7/19/1996 12:00:00 AM	8/16/1996 12:00:00 AM	7/29/1	<b>-</b>	TabControl
Rockville	00	10261	QUEDE	4	7/19/1996 12:00:00 AM	8/16/1996 12:00:00 AM	7/30/1	Т	TextBlock
Greensboro	00	10262	RATTC	8	7/22/1996 12:00:00 AM	8/19/1996 12:00:00 AM	7/25/1	abl	TextBox
Cary		10263	ERNSH	9	7/23/1996 12:00:00 AM	8/20/1996 12:00:00 AM	7/31/1		WPF Controls
Louisville		10264	FOLKO	6	7/24/1996 12:00:00 AM	8/21/1996 12:00:00 AM	8/23/1		
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### **ACTIPRO**

#### www.actiprosoftware.com

#### • Pro:

Many Controls

#### • Cons:

- Partially not enough documentation (ThemedDataGrid)
- TreeView-alternative: ,TreeListBox' not compliant to standards (Error: Do not set the ItemsSource property on this control. Set the RootItem property instead.)
- How to implement multiple levels in TreeListBox isn't apparent

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Fuller		10248	VINET	5	7/4/1996 12:00:00 AM	8/1/1996 1 *
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Peacock	-	10245	HANAR	4	7/8/1996 12:00:00 AM	8/5/1996 1
Buchanan		10250	VICTE	3	7/8/1996 12:00:00 AM	8/5/1996 1
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### DEVEXPRESS

#### www.devexpress.com

#### • Pros:

- Really good Designer-SmartTags
- Standard compliant programming model (e.g. DataGrid supports CellTemplates)
- Detailed documentation with many examples
- Support is filled up with useful solutions

#### • Cons:

- No own TreeView-Control (use Navigation Bar instead)
- No loading-indicator-Control
- Paging in DataGrid not included

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### GRAPECITY / COMPONENTONE

#### www.grapecity.com

#### • Pros:

- Standard compliant programming model (e.g. DataGrid supports CellTemplates)
- Distinct naming (C1ComboBox, C1NumericBox, C1DataGrid)
- Hidden AutoLookup-Feature (resolves e g. Employee automatically in the C1DataGrid)

#### Cons:

- No Designer-SmartTags
- Lack of answers in discussion board
- Documentation is too slim but can be balanced by sample Code
- Sometimes faulty mix-up of WPF and Silverlight in the documentation (example: Global Theming)
- Unsolved, but popular ComboBox-Bug (only when ItemTemplate is set): While selecting a bound object, you only see the ToString-output

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### INFRAGISTICS

#### www.infragistics.com

- Pros:
  - Many Controls
  - Sometimes comprehensive SmartTag-Designer
  - INFRAGISTICS-object-model fits itself (e.g. Value instead of Text)

#### Cons:

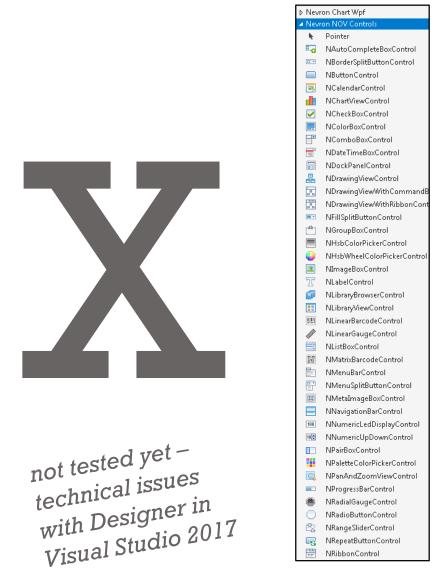
- No DataBinding Designer-Dialog
- Documentation kept too minimalistic
- Confusing at first glance due to two DataGrids (xamGrid, xamDataGrid)
- INFRAGISTICS-object-model not compliant with standards (e.g. DataSource instead of ItemsSource, Value instead of Text)
- Example: xamDataGrid:
  - No standards for naming (Columns Fields)
  - CellTemplate not possible (gets ignored)
  - Scrollbar doesn't scroll data, but shows only Tooltip

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### NEVRON

#### www.nevron.com

- Pro:
  - Unique and interesting Cross-Platform approach (unfortunately only as Code without Designer support)
- Note to failed test:
  - 1. Error: MessageBox text, that implies that a new reference has been added. Despite having a reference, the dialog reappears. Appendix: The ItemsSource-Property is not available!
  - 2. Reported bug to Nevron
  - Nevron response: Bug in their tools, appearing since Visual Studio 2015 – working to solve the problem
  - Suggestion by Nevron: Use Code-only Cross-Platform approach until the bug is fixed!





### SYNCFUSION

#### www.syncfusion.com

#### • Pros:

- Basic Designer-SmartTags
- Standard compliant programming model (e. g. DataGrid supports CellTemplates)
- Comprehensive documentation

#### • Cons:

- Obfuscating Control naming (TreeViewAdv, SfDataGrid, GridControl, SfTextBoxExt)
- Difficult Control choice (TextBox vs. SfTextBoxExt, UpDown vs. IntegerTextBox)
- No solution or simple manual to set a specific global theme.

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### TELERIK

#### www.telerik.com

#### Pros:

- Mostly standard compliant programming model
- Extraordinary Design
- Common animations included

#### • Cons:

- SmartTags without content (just online links)
- In the meantime aquired by Progress personal impression: support & user group sponsorship got worse
- Huge enforcement to be online (Installation, Samples, SmartTags)
- WPF Project-model is faulty (e.g. No active build for solution, lack of Designer-Namespace, and more)
- Styling a simple Window isn't possible (RadWindow is only for modal windows!)

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<ul> <li>Braintree</li> </ul>	88715036788ABA36	0 10252	SUPRD	4	7/9/1996 12:00	4 5	RadSplitContainer
Providence				-			LayoutControlSplitter
Wilton	38715036788ABA36	0 10253	HANAR	3	7/10/1996 12:0		LayoutControlToolBox
Morristown	38715036788ABA36	0 10254	CHOPS	5	7/11/1996 12:0		LayoutControlToolBoxView
	B8715036788ABA36	0 10255	RICSU	9	7/12/1996 12:0		LayoutControlExpanderGroup
Edison				-	7.45.4005.40.6		LayoutControlGroup
<ul> <li>New York</li> </ul>	88715036788ABA36	0 10256	WELLI	3	7/15/1996 12:0		LayoutControlTabGroup
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	00745005700404040		CENTC		7/10/1005 40.0		RadBookItem
<ul> <li>Fairport</li> </ul>	88715036788ABA36	0 10259	CENIC	4	7/18/1996 12:0	!	RadDesktopAlert
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Rockville	B8715036788ABA36	0 10261	QUEDE	4	7/19/1996 12:0	180	RadTileView
Greensboro			-		7/00//005 40.0		RadTileViewItem
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### XCEED

www.xceed.com

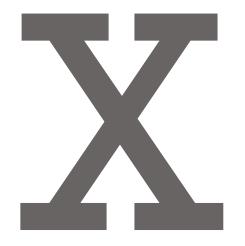
#### • Pros:

 Special focus on powerful and comprehensive DataGrid

#### • Note to failed test:

- 1. Toolbox in Visual Studio 2017 Enterprise doesn't contain Xceed Controls
- 2. Reported bug to Xceed
- 3. Xceed response: Bug only with VS 2017 Enterprise - works in VS 2017 Professional.
- 4. Suggestion by Xceed: Add Toolbox items at Customize Toolbox by yourself for now











## **CONCLUSION**



# by use of WPF

Rank	Producer	Scope of Package	Documentation / Samples / Support	Visual Studio Designer Integration / Rapid Application Development	Standard Compliance	Style / Theming	Score
1	DevExpress	🗙 4	☆4	🗙 4	☆ ३	📩 3	18
2	Syncfusion	🛧 4	☆4	12	🌟 2	<del>1/2</del> 3	15
3	Progress / Telerik	🛧 4	1/2	12	<del>1/2</del> 3	<del>1/2</del> 3	14
4	Infragistics	🃩 3	🏠 2	📩 3	-	だ 2	10
4	GrapeCity / ComponentOne	だ ३	1/2 2	☆1	🃩 2	だ 2	10
5	Actipro	📩 2	公1	☆ 1	🌟 2	公 1	Z 💻
6	Nevron	だ 3	-	-	-	公 1	4
-	Xceed	-	-	-	-	-	0

#### Note:

This ranking is based on the criteria named on top and reflect the personal experience of the contributor. Switching to different criteria and changing the emphasis on them might conclude to a different ranking. For example: If the Visual Studio Designer isn't important for you or one specific unique Control is required, the producers which have a low ranking rise to the top ranks. So the scores get mixed totally new.