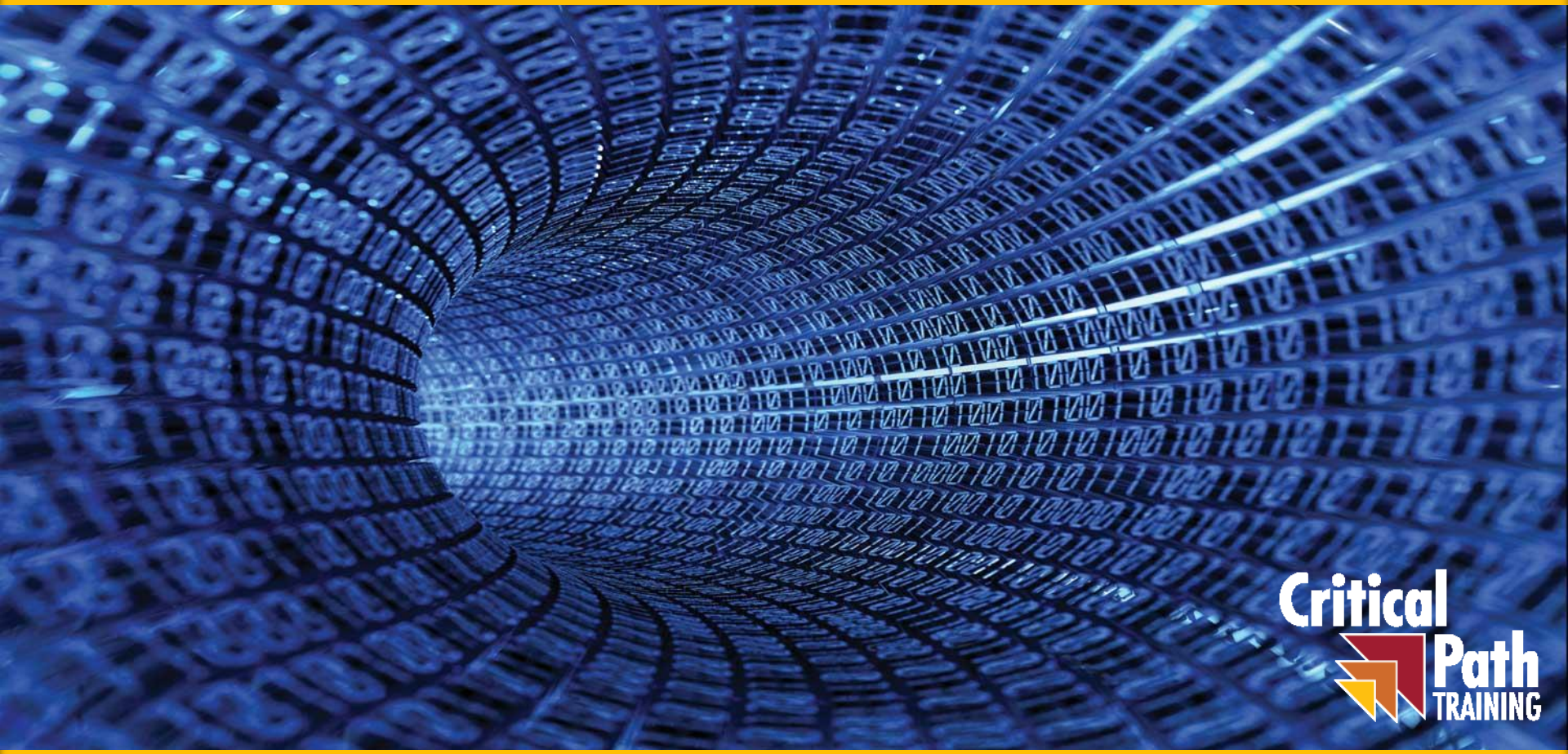
Building Custom Solutions using PowerApps



Agenda

- Working with Variables and Collections
- Managing Application State using Records and Tables
- Using Table Functions for Filtering, Sorting and Grouping
- Using Delegates to Filter, Sort and Aggregate Data
- Writing Imperative Logic in PowerApps Event Handlers

Input and Output Properties

- Input only
  - Value based on formula which cannot be used in other formulas
  - `Textinputbox1.Default` *(initial value)*
- Input/Output
  - Value based on formula which can be used in other formulas
  - `Textinputbox1.BackgroundColor`
- Output only
  - Value cannot be set by formula but can be used on other formulas
  - `Textinputbox1.Text` *(value always controlled by user input)*

Primitive Data Types

- Number: 3.141592
- Text: "Hello World"blank (e.g. null) values
- Boolean: True or False
- DateTime: 3/27/2018 12:00PM
- Date: 3/27/2018

- Any type can contain blank (i.e. null) values
  - Test for null value using IsBlank() function
  - Set null value using Blank() function

State Variables

- Collections
  - Created as tables at app scope
  - Managed using Collect, Clear and ClearCollection
  - Can be stored to local device using SaveData & LoadData
- Context variables
  - Created as primitive, record or table at screen scope
  - Managed using UpdateContext and Navigate
- Global variables
  - Created as primitive, record or table at app scope
  - Created and managed using Set function

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Compound Data Types

- Record

```
{ FirstName: "Chuck", LastName: "Sterling" }
```

- Table

```
Table( { FirstName: "Chuck", LastName: "Sterling" },
       { FirstName: "Ted", LastName: "Pattison" } )
```

- Shorthand for Table with one column named value

```
[ "Moe", "Curly", Larry" ]
```

- Records and tables can be nested
  - Table can contain records of tables of records…
  - Record can contain tables of records of tables …

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Table Functions

- Each table represented as a value
  - Table can be passed as argument
  - Table can be returned by function

- Functions that return tables
  - Filtering: `Filter`, `Search`
  - Sorting: `Sort`, `SortByColumns`
  - Shaping: `AddColumns`, `DropColumns`, `RenameColumns`
  - Grouping: `GroupBy`, `Ungroup`


DEMO
Filtering Data in a Table

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Events and State Changes

- Formulas for event properties can contain imperative logic
  - `OnSelect`, `OnVisible`, `OnStart`, etc.
- Imperative logic is used to take action
  - Set value of global variable or context variable
  - Add item to a collection
  - Navigate between screens
  - Submit data to server
- You can chain actions together with chaining operator (;)

```
Collect(Customers, {ID: NextCustomerId, FirstName: FirstNameTextInput.Text, LastName: LastNameTextInput.Text});
Reset(FirstNameTextInput);
Reset(LastNameTextInput);
Set(NextCustomerId, NextCustomerId+1);
```

App OnStart – Only on First Form

- Screen OnStart used to initialize app
  - Event only supported on startup screen for app
  - Can be used to initialize app-level variables

Imperative Functions

- These formulas can be used to perform actions

Abs	Collect	DateValue	ForAll	LookUp	Proper	Set	TimeValue
Acceleration	Color	Day	GroupBy	Lower	Radians	ShowColumns	TimeZoneOffset
Acos	ColorFade	Defaults	HashTags	Max	Rand	Shuffle	Today
Acot	ColorValue	Degrees	Hour	Mid	Refresh	Sin	Trim
AddColumns	Compass	Disable	If	Min	Remove	Sort	TrimEnds
And	Concat	Distinct	IsBlank	Minute	RemoveIf	SortByColumns	Ungroup
App	Concatenate	Download	IsEmpty	Mod	RenameColumns	Split	Update
Asin	Connection	DropColumns	IsMatch	Month	Replace	Sqrt	UpdateContext
Atan	Count	EditForm	IsNumeric	Navigate	Reset	StartsWith	UpdateIf
Atan2	Cos	Enable	IsToday	NewForm	ResetForm	StdevP	Upper
Average	Cot	EndsWith	Language	Not	Revert	Substitute	User
Back	CountA	Errors	Last	Now	RGBA	SubmitForm	Validate
Blank	CountIf	EncodeUrl	LastN	Or	Right	Sum	Value
Calendar	CountRows	Exit	Launch	Param	Round	Switch	VarP
Char	DataSourceInfo	Exp	Left	Parent	RoundDown	Table	ViewForm
Clear	Date	Filter	Len	Patch	RoundUp	Tan	Weekday
ClearCollect	DateAdd	Find	Ln	Pi	SaveData	Text	
Clock	DateDiff	First	LoadData	PlainText	Search	ThisItem	
Coalesce	DateTimeValue	FirstN	Location	Power	Second	Time	

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Understanding Delegation

- **Delegation** is where you can delegate the processing of data to a data source before the data is pulled in an app
  - Key to building efficient apps
  - Minimizes the amount of data that needs to be brought into the app
- PowerApps includes a powerful set of functions to filter, sort, and shape tables of data
  - Equivalent to writing database queries

Types of Delegate Functions

- **Filter functions**
  - *Filter*, *Search*, and *LookUp* can be delegated
- **Sorting functions**
  - *Sort* and *SortByColumns* can be delegated
- **Aggregate functions**
  - *Sum*, *Average*, *Min*, and *Max* can be delegated
  - Not all data sources support this delegation

https://powerapps.microsoft.com/en-us/tutorials/delegation-list/

Small and Large Data Sets

- **Large data sets (over 500 records)**
  - Requires using data sources and formulas that can be delegated
  - Only way to keep your app performing well and ensures users can access all the information they need
- **Small data sets (less than 500 records)**
  - Can use any data source and formula
  - Processing can be done locally if the formula cannot be delegated

Summary

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