LightningChart®

CHANGE LOG.

- All notable changes to this project will be documented in this file.
- The format is based on Keep a ChangeLog, and this project adheres to Semantic Versioning.

[3.4.0] - 2022-02-02

Added
- *Added `PalettedFill` support to Line and PointLine Series (2D and 3D)*
  - *2D series support all available lookup properties: `'x'`, `'y'` and `'value'`*
  - *3D series support `'x'`, `'y'` and `'z'` lookup properties*
- *Added MapChart.onViewChange*
  - *Allows laying ChartXY over MapChart for powerful and convenient geographical data visualization*
- *Added `Dashboard.getRowHeight`, `Dashboard.getColumnWidth`*
- *Added `PalettedFill` support to 2D and 3D axis strokes*
  - *Axes can now be colored dynamically based on `x`, `y` or `z` coordinate using `setStrokeStyle` method*
- *Added `CustomTick.onValueChange`*
- *Added `onDispose` method to all stand-alone chart components (`Dashboard`, `ChartXY`, `Chart3D`, etc.)*
- *Added support for data gaps in most XY series*
  - *Number.NaN can be used to specify a data gap*
  - *Supported by LineSeries, PointLineSeries, StepSeries, AreaSeries and AreaRangeSeries*
- *Added support for supplying data as typed arrays for most XY chart features*
  - *Affects following data methods: `addArrayX`, `addArrayY`, `addArraysXY`*
  - *At this time, this does not increase performance, when compared to any previous method of supplying data*

Changed
- *Significantly improved LineSeries visual quality when using progressive data pattern.*
  - *Line looks clearly sharper and smoother.*

Fixed
- *Fixed `ZoomBandChart` displaying step series as line series*
- *Fixed Point Line Series incorrect fitting on first frame when scroll strategy is `undefined`.*
- *Fixed CustomTicks being rendered above series.*
- *Fixed `LineSeries` with progressive data pattern looking slightly off in some very specific scenarios*
- *Fixed auto cursor flickering when moved above series with rapidly clearing data*
  - *Applies to use cases that do `Series.clear().add(...)` very rapidly*
  - *Also applies to use of `Chart.solveNearest` if used in above scenario*
- *Fixed CustomTick gridline sometimes spanning outside the chart area*
- *Fixed `ChartXY.dispose()` not removing bands and some other components when used inside Dashboard.*
- *Fixed `MapChart.setAutoCursorMode(AutoCursorModes.disabled)` not hiding cursor*
- *Fixed `PointSeries.clear()` still showing cleared data until new data is added.*
- *Fixed crash when disposing and recreating Chart3D.*
- *Fixed surface series crash when phong shading style is enabled.*

[3.3.0] - 2021-12-01

Added

- *Added Chart3D zoom animation*
  - *This is present when using mouse wheel or trackpad*
  - *Can be disabled with `Chart3D.setAnimationZoom(false)`*
- *Added `NewSurfaceGridSeries3D`*
  - *Optimized version of previous surface grid series feature*
  - *This new feature has even up to 1000x better performance. Usage is almost exactly same*
- *Added `SurfaceScrollingGridSeries3D`*
  - *Specially designed series type for scrolling surface applications*
  - *Compared to previous surface grid series feature, has up to 1000x better performance*
- *Added `Theme.surfaceSeriesWireframeStyle`*
- *Added `CullMode3D`. This can be used with new 3D surface series*
- *Added `TriangulatedPoints3DProperties.wireframeStyle`. This allows drawing wireframe for 3D points. Disabled by default.*
- *Added `ChartXY.getDefaultAxes`, `Chart3D.getDefaultAxes`*
  - *Convenience methods for applying same operations to several axes*
- *Added `ZoomBandChartOptions.bandAboveSeries` to indicate whether band should be displayed above or below series.*
  - *Previously band was always under series.*
  - *Defaults to `true`, to display similarly as before set to `false`.*
- *Added `SpiderChart.setScaleLabelFormatter`*
- *Added optional `automaticColorIndex` property to all XY series options*
  - *This allows interacting with the default themes automatic coloring of several series*
- *Added `CustomTick.setAllocatesAxisSpace()`*
  - *Can be used to disable axis allocating space for particular custom ticks.*
- *Added `lineAntiAlias` EngineOption.*
  - *This can be used to explicitly disable line anti-aliasing.*
- *Added `Chart3D.onCameraChange`, `Chart3D.offCameraChange`.*
- *Added `TimeTickStrategy.setTimeOrigin` option, works similarly to `DateTimeTickStrategy.setDateOrigin`*
- *Added `ImageFill` style.*
  - *Allows filling any rectangular shape in chart based on external image or video.*
- *Added `EngineSettings.webgl` to allow specifying used WebGL (graphics framework) version.*

Changed

- *Webpack 5 no longer requires additional configuration for Node JS core modules.*
- *`ZoomBandChart` now automatically matches the TickStrategy of first attached axis.*
  - *ZBC axis can be manually modified using `getDefaultAxisX` and `getDefaultAxisY` methods, just like `ChartXY`*
- *Significant optimizations to `HeatmapGridSeriesIntensityValues` and `HeatmapScrollingGridSeriesIntensityValues`*
  - *Load-up speed increased by ~250%*
  - *Load-up speed of empty heatmap increased by 10x*
  - *Memory usage decreased by ~60%*
  - *Intensity data update speed increased significantly*
  - *Find latest conclusive performance updates at our website https://www.arction.com/high-performance-javascript-charts/*
- *Added default wireframe style to heatmap grid series*
  - *To disable wireframe, use `setWireframeStyle(emptyLine)`*
- *Heatmap grid series legend entries are no longer colored based on wireframe style*
- *Changed default Chart3D bounding box stroke style to `emptyLine`*
  - *Use `Chart3D.setBoundingBoxStrokeStyle` to specify bounding box stroke style.*
- *Added little bit of default left padding to `UICheckBox` and `UIButtonBox`*
- *Changed default right padding in XY chart from 10px to 24px*
  - *To change right padding, use ChartXY.setPadding({ right: 10 })*
- *Enabled Axis3D scroll animation by default.*
  - *To restore previous behavior, use `Axis3D.setAnimationScroll(false)` for each 3D axis.*
  - *Axes can be referenced like this `Chart3D.getDefaultAxisX()`.*
- *Improved line anti-aliasing quality.*
  - *Primitive lines, with only hardware anti-aliasing, can now be drawn by setting the line thickness to `-1`.*
  - *Previously primitive lines were used when line thickness was set to `1`, now to use primitive lines you will need to use `-1` as the thickness.*
  - *By default lines with thickness of `1` are now rendered with higher quality anti-aliasing.*
- *Improved track-pad interactions with ChartXY and Chart3D (previously it was much too sensitive).*
  - *Known issue: track-pad is still too sensitive on Safari.*
- *LightningChart JS now uses `WebGL 2` whenever supported. This shouldn't introduce any major difference to existing applications and users. If anything, `WebGL 2` should work better.*
- *`DateTimeTickStrategy.setFormatting...` methods now allow supplying `undefined` for any value (only overriding particular settings).*
- *`DateTimeTickStrategy.setFormattingSecond` now allows configuring formatting of minor ticks at that level.*
  - *This option was incorrectly missing before.*
- *Charts now automatically trigger layout operation when chart container is resized.*
- *This is done by using a ResizeObserver if the browser has support for it.*
- *`TriangulatedPoints3DProperties.size` can now be `Coord3D`. This allows drawing 3D points with sizes on X, Y and Z Axes.*
- *`ZoomBandChart` band is now drawn above series.*
- *`ZoomBandChart` now supports Heatmap series (non-scrolling variant only).*
- *`ZoomBandChart` can now be attached to several axis by supplying an array instead of just one axis when it is created.*

- *`ZoomBandChart` now automatically aligns its right side according to reference charts.*
  - *Previously only left side was aligned.*
- *Tweaks to default Axis ticks*
  - *In XY charts, ticks that do not fit no longer display their tickline and gridline. Previously, only the label was hidden.*
  - *Fixed Numeric major ticks sometimes behaving strange when there is little axis space available. For example, showing 1, 3, 5 instead of 0, 2, 4, 6.*
  - *Numeric minor ticks are no longer displayed if the axis is shorter than 50 pixels.*
  - *Slightly adjusted the selection of Numeric tick level. Larger tick levels are now activated slightly less eagerly.*
- *ChartXY title no longer allocates top & bottom margins when title length is ''*

Fixed

- *Fixed spline series mouse interactions being triggered when mouse was outside of spline.*
- *Fixed Map Charts not properly stopping mouse and touch events.*
- *Fixed dashboard series sometimes not rendering after disposing and creating several charts*
- *Fixed Test Domain being prioritized over Deployment Domain.*
  - *Resulted in "Deployment Test" watermark being rendered in a valid Deployment Domain.*
- *Fixed bad performance when repeatedly triggering `clear` + `add` methods for `LineSeries` or `PointSeries`.*
- *Fixed heatmap series not updating palette if configured after intensity data.*
- *Fixed GaugeChart disableAnimations flag not working when inside Dashboard.*
- *Fixed GaugeChart behaving strange when animations are enabled and slice value is changed rapidly.*
- *Improved high CPU usage in Chart3D when camera is rotated with automatic fitting enabled.*
- *Fixed 3D pixelated points having different visible size with different device pixel ratio monitors.*
- *Fixed chart interaction not properly canceled when interaction goes over OSM element.*
- *Fixed 3D chart centering after resize -`LinearGradientFill` and `RadialGradientFill` now properly thrown an error when color stop definition doesn't contain enough color stops.*
- *Fixed `IntensityGrid` and `IntensityMesh` not rendering after restored when using `IndividualPointFill`.*
- *Fixed `Axis` event API having some incorrect typings (wheel, drag & touch events) and callback not receiving all arguments.*
- *Fixed `HeatmapScrollingGridSeriesIntensityValues` scrolling sometimes behaving strangely (pausing or skipping ahead).*
- *Fixed `Axis` animations sometimes not disabled even if chart animations are disabled.*
- *Fixed touch events not properly cancelled when touch event goes over OSM.*
- *Fixed XY and Polar Axis sometimes rendering incorrectly for 1 frame after window resize.*

Deprecated

- *Deprecated `Chart3D.addSurfaceSeries`*
  - *To keep using surface grid series, use `Chart3D.addSurfaceGridSeries`.*
    - *This is a new series type with slightly changed API and greatly increased performance*
  - *To keep using surface mesh series, use `Chart3D.addSurfaceMeshSeries`*
- *Deprecated `Axis.setTickStyle`. Use `setTickStrategy` instead.*
- *Deprecated `LUT.valueRangeMin`, `LUT.valueRangeMax`. They do not affect anything anymore*
- *Deprecated `HeatmapGridSeries.setPixelInterpolationMode`, use `setIntensityInterpolation` instead*
- *Deprecated some inconsistently named methods of `Axis`:*
  - *`onAxisAreaMouseDragStart` -> `onAxisInteractionAreaMouseDragStart`*
  - *`onAxisAreaMouseDrag` -> `onAxisInteractionAreaMouseDrag`*
  - *`onAxisAreaMouseDragStop` -> `onAxisInteractionAreaMouseDragStop`*
  - *`onAxisInteractionAreaMouseTouchStart` -> `onAxisInteractionAreaTouchStart`*
  - *`onAxisInteractionAreaMouseTouch` -> `onAxisInteractionAreaTouch`*
  - *`onAxisInteractionAreaMouseTouchStop` -> `onAxisInteractionAreaTouchStop`*
  - *`offAxisInteractionAreaMouseTouchStart` -> `offAxisInteractionAreaTouchStart`*
  - *`offAxisInteractionAreaMouseTouch` -> `offAxisInteractionAreaTouch`*
  - *`offAxisInteractionAreaMouseTouchStop` -> `offAxisInteractionAreaTouchStop`*
- *`ZoomBandChart.attachedAxis`, use `attachedAxes` (array property) instead.*

[3.2.0] - 2021-09-22

Added
- *Added `DateTimeTickStrategy.setCursorFormatter` for easy modification of cursor ticks formatting.*
- *Added `NumericTickStrategy.setCursorFormatter` for easy modification of cursor ticks formatting.*
- *Added `TimeTickStrategy.setCursorFormatter` for modification of cursor ticks formatting.*
- *Added `axis.setThickness`.*
  - *This can be used to control the width or height of axis depending on is the axis Y or X axis.*
- *Added primitive draw mode to `LineSeries3D` and `PointLineSeries3D`.*
  - *This feature can be used for improved performance by reducing line depth perception.*
  - *See `setStrokeStyle` method for more information.*
- *Added `series.setAutoScrollingEnabled` for disabling scrolling and fitting of specific series.*
- *Added `synchronizeAxisIntervals`. Utility for synchronizing intervals of one or more axis.*

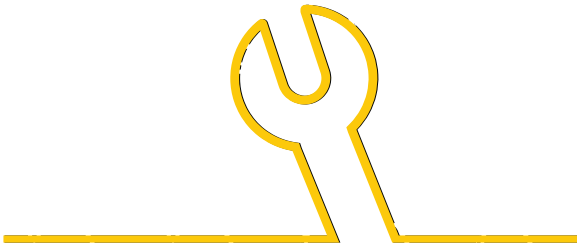
Changed
- *Improved default Date time cursor formatting to display Year, month, day, hour and minute information. This can be modified with new method `DateTimeTickStrategy.setCursorFormatter`.*
- *Added `dataPoint` parameter to `SeriesXYFormatter`. This allows using `value`, `size`, `color`, `rotation` and custom values in cursor result table formatters.*
- *`ZoomBandChart` now automatically aligns itself with the reference chart.*
- *Community version no longer has performance penalty.*
- *`NumericTickStrategy.setFormattingFunction` now also affects default cursor result table formatting and cursor ticks formatting.*
- *`SolidGauge.setIntervalLabelFormatter` and `setDataLabelFormatter` now also accept callback functions which can be used to display text that is not strictly numbers.*
- *Improved axis tick rendering performance.*

Fixed
- *Fixed ChartXY UI element positioning on axis.*
- *Fixed map chart AutoCursor not usable with touch.*
- *Fixed `ZoomBandChart` not reacting to `Dashboard` `theme` or `disableAnimations` options.*
- *`PointSeries3D` no longer crashes when styled with `PalettedFill`.*
- *`PointSeries3D` now displays color lookup table range when attached to a legend box and styled with paletted fill.*
- *Fixed edge case in text rendering when creating text with large font size.*
- *Fixed occasional error message when zooming in and out line series rapidly.*
- *Fixed incorrect rendering behavior when chart is transitioned to fullscreen on Safari.*
- *Fixed incorrect legend box entry alignment after restoring the legend box entry.*
- *Fixed `OHLCSeries` sometimes not being visible, especially when chart is created and animations are disabled.*
- *Fixed point, line and range series `getPointAmount` not counting points that were added just before.*
- *Fixed empty series affecting automatic fitting of series.*
- *LightningChart JS logo now renders properly on high DPI devices with `window.devicePixelRatio` greater than 1.*
- *Fixed poor performance when adding new points to charts with 1 million or more points in some cases.*
- *Fixed `HeatmapGridSeries.getWireframeStyle` returning `FillStyle` instead of `LineStyle`.*
- *Fixed TypeScript issue with being able to pass `LineStyle` as `FillStyle` or vice versa.*
- *Fixed `HeatmapScrollingGridSeries` not attaching to any other axis than default chart axis.*
- *Fixed `IntensityGridSeries` and `IntensityMeshSeries` not rendering after it has been restored.*

[3.1.0] - 2021-07-28

Added

- *Added new chart type, `MapChart`.*
  - *`MapChart` has multiple views for visualizing data in different regions of world.*
  - *Supports real-time data updates with high FPS.*
- *Added new series type, `PolygonSeries`.*
  - *This series can be created with `ChartXY.addPolygonSeries`.*
  - *`PolygonSeries.add` returns you a `PolygonFigure` object which can be used to style the polygon.*
- *Added improved series type `HeatmapGridSeries`.*
  - *This series can be created with `ChartXY.addHeatmapGridSeries`.*
  - *Replaces the existing `IntensityGridSeries` (`ChartXY.addHeatmapSeries`) which is now considered deprecated and will be removed in next major release.*
  - *This new series type provides considerably better performance compared to the previous version.*
- *Added new series type `HeatmapScrollingGridSeries`.*
  - *This series can be created with `ChartXY.addHeatmapScrollingGridSeries`.*
  - *Provides a way to create scrolling heatmap with data cleaning support.*
- *Added new methods to help to make better experience on devices with smaller screens.*
  - *`UIElement.setAutoDispose`, `UIElement.getAutoDispose`*
- *Added `High precision XY Axis`.*
  - *New XY Axis type that allows zooming to smaller axis intervals with drawback of decreased performance. Refer to `AxisOptions` documentation for instructions.*
  - *This is considered an experimental feature and might be changed in a minor or major release with no backwards compatibility.*
- *Added `AxisTickStrategies.Time`.*
  - *New automatic ticks strategy for depicting axis intervals between hundreds of hours and individual nanoseconds.*
- *Added `TimeFormattingFunctions` helper methods for formatting millisecond time stamps to different time string formats.*
- *Added `LUT` parameter to `UILUTCheckBox.setLUTStepValueFormatter` callback.*
- *Added new options to `LUT`, `LUT.valueRangeMin` and `LUT.valueRangeMax`.*



- *Added new control for suppressing warnings that are mostly useful when developing, `LightningChartOptions.warnings`.*
- *Added `NumericTickStrategy.formattingOffset`, works similarly to `DateTimeTickStrategy.setDateOrigin`.*
- *Ability to rotate all texts.*
  - *`Chart.setTitleRotation`*
  - *`Axis.setTitleRotation`*
  - *`VisibleTicks.setLabelRotation`*
  - *`ResultTable.setTextRotation`*
  - *`CustomTick.setTickLabelRotation`*
  - *`LegendBox.setTitleRotation`*
  - *`UITextBox.setTextRotation`*
- *Added helper method `Chart.zoom`.*
- *Added helper method `Chart.pan`.*
- *Added missing API `PolarChart.getSeries`.*
- *Added missing API `Chart3D.getSeries`.*
- *Added ability to control mouse and touch interaction state to 3D Chart.*
  - *`Chart3D.setMouseInteractions`*
  - *`Chart3D.setMouseInteractionZoom`, `Chart3D.getMouseInteractionZoom`*
  - *`Chart3D.setMouseInteractionRotate`, `Chart3D.getMouseInteractionRotate`*
- *Added `LineSeries3D.setStrokeStyle, getStrokeStyle, setStrokeStyleHighlight, getStrokeStyleHighlight`.*
  - *These replace the similarly named `LineSeries3D.setLineStyle, getLineStyle, setLineStyleHighlight, getLineStyleHighlight`.*
- *Added `PointLineSeries3D.setStrokeStyle, getStrokeStyle, setStrokeStyleHighlight, getStrokeStyleHighlight`*
  - *These replace the similarly named `PointLineSeries3D.setLineStyle, getLineStyle, setLineStyleHighlight, getLineStyleHighlight`.*
- *Added `individualPointColorEnabled`, `individualPointSizeEnabled` and `individualLookupValuesEnabled` to `PointSeriesOptions3D`.*
- *Added `UIElementBuilders.LUTRange`.*
- *Added more control to how 3D series are shaded.*
  - *`Series3D.setColorShadingStyle`, `Series3D.getColorShadingStyle`*
- *Added new Shading style `ColorShadingStyles.Simple`.*
  - *This shading style can make some 3D visualizations look better by removing all shading and using the object colors directly.*
  - *Using this shading style can improve performance on low end devices.*
- *Added new Shading style `ColorShadingStyles.Phong`.*
  - *This has been the default shading style for all 3D features since the 3D features were introduced.*
  - *You can now control `ambientColor`, `ambientReflection`, `diffuseReflection`, `specularReflection`, `specularColor` and `shininess` options.*

- *Added `ChartXY.addOnScreenMenu`.*
  - *`OnScreenMenu` can be used to create UI controls over the chart.*
  - *This is considered an experimental feature and might be changed in a minor or major release with no backwards compatibility.*
- *Added new theme styling options.*
  - *`Theme.lineSeries3DStrokeStyle`*
  - *`Theme.pointSeries3DPointStyle`*
  - *`Theme.pointLineSeries3DStrokeStyle`*
  - *`Theme.pointLineSeries3DPointStyle`*
  - *`Theme.pointCloudSeries3DPointStyle`*
  - *`Theme.polygonSeriesFillStyle`*
  - *`Theme.polygonSeriesStrokeStyle`*
  - *`Theme.heatmapFillStyle`*
  - *`Theme.heatmapWireframeStyle`*
  - *`Theme.heatmapGridSeriesFillStyle`*
  - *`Theme.heatmapGridSeriesWireframeStyle`*
  - *`Theme.rectangleSeriesFillStyle`*
  - *`Theme.rectangleSeriesStrokeStyle`*
  - *`Theme.polarAreaSeriesFillStyle`*
  - *`Theme.polarAreaSeriesStrokeStyle`*
  - *`Theme.polarAreaSeriesStrokeStyle`*
  - *`Theme.uiPointableTextBoxFillStyle`*
  - *`Theme.uiPointableTextBoxTextFillStyle`*
  - *`Theme.uiPointableTextBoxStrokeStyle`*
  - *`Theme.uiPointableTextBoxFont`*
  - *`Theme.uiTickTextFillStyle`*
  - *`Theme.uiTickStrokeStyle`*
  - *`Theme.uiTickFont`*
- *Added new themes.*
  - *`Themes.darkGold`*
  - *`Themes.darkGreen`*
  - *`Themes.darkLime`*
  - *`Themes.darkMagenta`*
  - *`Themes.darkRed`*
  - *`Themes.darkTurquoise`*
  - *`Themes.blueSciFiNew`*
  - *`Themes.glacier`*
  - *`Themes.lightNew`*
  - *`Themes.lightNature`*
  - *`Themes.darkNature`*
  - *`Themes.duskInLapland`*
  - *`Themes.auroraBorealisNew`*
  - *`Themes.cyberSpace`*
  - *Themes that end with suffix `New` will replace similarly named theme with no `New` suffix.*
- *Most Theme series style properties now support Palette definition optionally as well.*

Changed
- *`FormattingFunctions.Numeric` now also works for more than 3 decimal parts.*
- *`PointSeries3D` now supports `IndividualPointFill` style and `PalettedFill` style.*
- *`PointSeries3D` performance has been greatly improved overall.*
- *`LineSeries3D` performance has been greatly improved overall.*
- *`PointLineSeries3D` performance has been greatly improved overall.*
- *Removed _empty UI backgrounds_ from all default UI builders. This makes it easier to style UI backgrounds - afterwards, only using `setBackground(bg => bg.setFillStyle(...))` will always be enough.*
- *Changed UI default background behavior - now ALL UI elements will always have background styled according to Theme by default. To hide background, use `setBackground(bg => bg.setFillStyle(...))`, etc.*
- *`DateTimeTickStrategy` default cursor formatting now falls back to major ticks formatting if minor ticks are disabled.*
- *Improved LUT precision.*

Removed

Fixed
- *Improved 3D color shading, and fixed some cases with incorrect lighting.*
- *Fixed some scenarios where GPU memory wasn't freed when it could have been freed.*
- *WebGL context wasn't marked as 'lost' when chart/dashboard was completely disposed.*
- *Fixed `GL_INVALID_VALUE : glScissor` warning.*
- *Fixed crash when Pie chart of type `PieChartTypes.LabelsOnSides` was created with only one slice.*
- *Fixed 3D Point Line Series point size not updated to match highlight size when highlighted.*
- *Fixed 3D Point Line Series point size could be smaller than line thickness, after changing line thickness, resulting in visible gaps in line.*

Deprecated
- *`Theme.seriesNonTriangulatedPointStyle3D`. Use `Theme.pointCloudSeries3DPointStyle` instead.*
- *`Theme.seriesTriangulatedPointStyle3D`. Use `Theme.pointSeries3DPointStyle` instead.*
- *`Theme.customTickMarkerFillStyle`. Use `Theme.uiPointableTextBoxFillStyle` instead.*
- *`Theme.customTickMarkerTextFillStyle`. Use either `customTickMarkerTextFillStyle` or `uiTickTextFillStyle`.*
- *`Theme.customTickMarkerStrokeStyle`. Use either `uiPointableTextBoxStrokeStyle` or `uiTickStrokeStyle`.*
- *`Theme.pointMarkerHorizontalGridStrokeStyle`. Use `customTickGridStrokeStyle` instead.*
- *`Theme.pointMarkerVerticalGridStrokeStyle`. Use `customTickGridStrokeStyle` instead.*
- *`Theme.axisLabelFillStyle`. Use `numericTickStrategy` or other _tick strategy_ property instead.*
- *`Theme.axisLabelFont`. Use `numericTickStrategy` or other _tick strategy_ property instead.*
- *`Theme.pointMarkerTextFillStyle`. Use `uiPointableTextBoxTextFillStyle` or `uiTickTextFillStyle` instead.*
- *`Theme.seriesStrokeStyle3D`. Use `Theme.lineSeries3DStrokeStyle` instead.*
- *`Theme.seriesNonTriangulatedPointStyle3D`. Use `Theme.pointCloudSeries3DPointStyle` instead.*
- *`Theme.seriesTriangulatedPointStyle3D`. Use `Theme.pointSeries3DPointStyle` instead.*

- `LineSeries3D.setLineStyle`. Use `setStrokeStyle` instead.
- `LineSeries3D.getLineStyle`. Use `getStrokeStyle` instead.
- `LineSeries3D.setLineStyleHighlight`. Use `setStrokeStyleHighlight` instead.
- `LineSeries3D.getLineStyleHighlight`. Use `getStrokeStyleHighlight` instead.
- `PointLineSeries3D.setLineStyle`. Use `setStrokeStyle` instead.
- `PointLineSeries3D.getLineStyle`. Use `getStrokeStyle` instead.
- `PointLineSeries3D.setLineStyleHighlight`. Use `setStrokeStyleHighlight` instead.
- `PointLineSeries3D.getLineStyleHighlight`. Use `getStrokeStyleHighlight` instead.
- `ChartXY.disableAnimations()` use `ChartXY.setAnimationsEnabled(false)` instead.
- `Axis.disableAnimations()` use `Axis.setAnimationsEnabled(false)` instead.
- `Dashboard.disableAnimations()` use `Dashboard.setAnimationsEnabled(false)` instead.
- `Spider.disableAnimations()` use `Spider.setAnimationsEnabled(false)` instead.
- `Polar.disableAnimations()` use `Polar.setAnimationsEnabled(false)` instead.
- `Pie.disableAnimations()` use `Pie.setAnimationsEnabled(false)` instead.
- `Gauge.disableAnimations()` use `Gauge.setAnimationsEnabled(false)` instead.
- `Funnel.disableAnimations()` use `Funnel.setAnimationsEnabled(false)` instead.
- `Pyramid.disableAnimations()` use `Pyramid.setAnimationsEnabled(false)` instead.
- `Map.disableAnimations()` use `Map.setAnimationsEnabled(false)` instead.
- `Chart3D.disableAnimations()` use `Chart3D.setAnimationsEnabled(false)` instead.
- `Series.setMaxPointCount()` use `Series.setDataCleaning()` instead.
- `Series.setDataCleaningThreshold()` use `Series.setDataCleaning()` instead.

[3.0.1] - 2021-05-26

Added
- PointSeries, PointLineSeries, SplineSeries and StepSeries now support data point 'value' paletted coloring.

Fixed
- PointSeries, PointLineSeries, SplineSeries and StepSeries now properly interact with Legend LUT UI element if styled with PalettedFill.
- LineSeries and AreaSeries stroke gradient stroke style sometimes would render incorrectly.
- WebGL Errors in some scenarios when running 3D charts on Android Chrome.
- Fixed LUT Unit label clipping out of legend box in some configurations.
- Rectangle gradient stroke style not working properly.
- Chart would try to zoom out when zooming in with touch gesture.
- Surface 3D theme style only applied after the series was highlighted or style was explicitly set.
- Box Series 3D legend box entry not styled according to the series fill style.
- Axis pan direction could be reversed when chart was in dashboard and the chart was resized using a splitter and the axis was reversed.
- Axis interval selection visual incorrect height in some scenarios.
- Opposite axis positioning was incorrect before first update after the axis was added.
- Polar Sector low resolution in some cases.
- Fixed missing LineSeries mouse interactions.
  - LineSeries Mouse interactions are disabled by default for performance reasons regarding freeform line series.
  - Call LineSeries.setMouseInteractions(true) to enable mouse interactions if interactions are needed.
- Fixed minor grid lines sometimes rendering over major grid lines

[3.0.0] - 2020-05-05

Added

- *PolarChart*
- *PolarAxisAmplitude*
- *PolarAxisRadial*
- *PolarPoint*
- *PolarPointSeries*
- *PolarLineSeries*
- *PolarPointLineSeries*
- *PolarAreaSeries*
- *PolarPolygonSeries*
- *PolarSector*
- *Logarithmic axis support for XY charts*
- *BoxSeries3D now supports PalettedFill by x, y or z*
- *LineSeries.setDataCleaningThreshold, getDataCleaningThreshold*
- *LineSeries.setCursorSolveBasis, getCursorSolveBasis*
- *PointLineSeries.setCursorSolveBasis, getCursorSolveBasis*
- *SplineSeries.setCursorSolveBasis, getCursorSolveBasis*
- *StepSeries.setCursorSolveBasis, getCursorSolveBasis*
- *UILUTCheckBox*
- *API for Axis mouse and touch events*
- *UITick*
- *UITickBuilder*
- *UIElementBuilders.AxisTick*
- *Configuration options for changing mouse interactions to different mouse buttons*
- *UILegendBoxPanel.setLegendBoxes*
- *NumericTickStrategy.setExtremeFormattingFunction*
- *NumericTickStrategy.setMajorFormattingFunction*
- *NumericTickStrategy.setMinorFormattingFunction*
- *API for subscribing to mouse and touch events on chart background*
- *Dependency to earcut (https://github.com/mapbox/earcut).*
  Used for Polygon triangulation.

Changed

- *Attaching a series with color lookup table (LUT) now automatically visualizes the color steps with a LUTUICheckBox component.*
- *LegendBox title is no longer automatically set to match chart title. Title can be set with new method LegendBox.setTitle.*
- *Tweaked LegendBox default style to look a bit nicer.*
- *LegendBox.add API has changed. Refer to migration guide for details.*
- *LegendBoxEntry is now styled accordingly with series PalettedFill.*
- *Nib mouse wheel behavior is now more intuitive*
- *Default style of XY Markers was changed to same as AutoCursor*
- *Renamed CustomTick.setTopPadding -> setTickLabelPadding*
- *Renamed PointableTextBox -> UIPointableTextBox*
- *Major improvements to text rendering performance*
- *Changed default CheckBox button picture to UIButtonPictures.Circle*
- *Renamed ResultTable.setFont to setTextFont*
- *Renamed UITextBox.setFont to setTextFont*
- *Renamed UICheckBox.setFont to setTextFont*
- *Renamed LegendBoxEntry.setFont to setTextFont*
- *Theme.chartBackgroundFillStyle renamed to seriesBackgroundFillStyle*
- *Theme.chartBackgroundStrokeStyle renamed to seriesBackgroundStrokeStyle*
- *on/offChartBackground... event methods were renamed to on/offSeriesBackground...*
- *setChartBackgroundFillStyle methods renamed to setSeriesBackgroundFillStyle*
- *getChartBackgroundFillStyle methods renamed to getSeriesBackgroundFillStyle*
- *setChartBackgroundStrokeStyle methods renamed to setSeriesBackgroundStrokeStyle*
- *getChartBackgroundStrokeStyle methods renamed to getSeriesBackgroundStrokeStyle*
- *Changed default CheckBox button picture to UIButtonPictures.Circle*
- *UILegendBoxPanel.add no longer accepts series, or other attachables. Only chart or dashboard can be supplied.*
- *Default LegendBox alignment changed from horizontal to vertical.*
- *Improved default LegendBox positioning.*
- *Changed default cursor solve basis of all line series' to 'nearest-x'. This can be changed with new method: setCursorSolveBasis*
- *Improved Line Series rendering algorithms for progressive and real-time rendering, to perform much faster and look better.*
- *Heavily optimized progressive Line Series with user zooming in/out and automatic scrolling*
- *Significantly improved Line Series memory usage in scrolling applications with data cleaning enabled*
- *AreaSeries and AreaRangeSeries cursor now behaves as expected, by picking closest data point along X dimension. Cursor now also performs better.*
- *All dataPattern options have been changed. Instead of selecting an option from DataPatterns export, use object format instead, for example { pattern: 'ProgressiveX' }. See documentation/migration guide for details.*
- *onPanelBackground... -methods were renamed to onBackground...*
- *Renamed setResultTableFormatter, and getResultTableFormatter methods to setCursorResultTableFormatter, and getCursorResultTableFormatter respectively.*
- *Improved API documentation*

Removed

- *DefaultLibraryStyle - Use Themes.dark or any other Theme instead.*
- *UILegendBoxPanel title API (setTitle, getTitle, setTitleFillStyle, getTitleFillStyle, setTitleFont, getTitleFont).*
- *UILegendBoxPanel.setEntries, use UILegendBoxPanel.setLegendBoxes for same functionality.*
- *Boolean parameter to ChartXY.addAxisX and addAxisY. Replaced with object syntax*
- *NumericAxisTickStrategy.setFormattingFunction. Replaced with individual setters for each tick level.*
- *CustomTick.setPaddingBottom (can be accessed via TickMarker background)*
- *CustomTick.setSidePaddings (can be accessed via TickMarker background)*
- *CursorBuilderXY.setTickMarkerXBackground*
- *CursorBuilderXY.setTickMarkerYBackground*
- *PointSeriesOptions3D.pointShape, use PointSeries3D.setPointStyle instead.*
- *PointLineSeriesOptions3D.pointShape, use PointLineSeries3D.setPointStyle instead.*
- *Theme.numericTickStrategy3D use Theme.numericTickStrategy instead.*
- *Theme.dateTimeTickStrategy3D use Theme.dateTimeTickStrategy instead.*
- *DataPatterns. Use object format instead, for example { pattern: 'ProgressiveX' }. See documentation/migration guide for details.*

Fixed

- *Fixed ticks overlapping other ticks in some cases*
- *Fixed LUT unexpected color step behavior when interpolation is disabled*
- *Fixed Axis.fit() when Series points are in a straight line*
- *Fixed progressive Axis scrolling sometimes getting ahead of series*
- *Fixed scenario where chart rendered with 1px x 1px canvas*
- *Fixed Constant line and Band touch events not working inside dashboard.*
- *Fixed mouse leave event not fired correctly in all cases*
- *Fixed missing configuration for 3D chart creation inside dashboard, theme and disableAnimations can now be properly set*
- *Fixed improper dispose behavior of ChartXY*
- *IntensitySeries now supports highlighting when styled with SolidFill*
- *IntensitySeries style is now properly matched in LegendBox*
- *SurfaceSeries3D style is now properly matched in LegendBox*
- *SurfaceSeries3D is now properly highlighted when hovering over respective LegendBoxEntry*
- *Fixed some cases where series boundaries were one frame behind actual boundaries*
- *Resolved some Z-fighting issues with SurfaceSeries3D wireframe and surface.*
- *Fixed SurfaceSeries3D and HeatmapMeshSeries not accounting boundaries of first and last column & row.*
- *Fixed axis nib mouse wheel scroll event wasn't properly stopped when interaction happened.*
- *Fixed IntensitySeries not updating when using addColumn to add only values*
- *Fixed type issues when using strict type checking mode with TypeScript*
- *Fixed linear gradient interpolation being incorrect when devicePixelRatio wasn't exactly 1.*

[2.2.1] - 2020-01-28

Fixed
- *License verification error when using a valid license*

[2.2.0] - 2020-01-27

Added
- *Chart3D series background*
    - *Chart3D.setSeriesBackgroundFillStyle*
    - *Chart3D.setSeriesBackgroundStrokeStyle*
- *3D BoundingBox style API*
    - *Chart3D.setBoundingBoxStrokeStyle*
    - *Chart3D.getBoundingBoxStrokeStyle*
- *3D camera behavior control*
    - *Chart3D.setCameraAutomaticFittingEnabled*
    - *Chart3D.getCameraAutomaticFittingEnabled*
- *New color palettes for palettes that match with the themes added in 2.1.0*
    - *auroraBorealis*
    - *blueSciFi*
    - *light*
    - *monochrome*
    - *night*
    - *sunset2*
- *Add get/setResultTableFormatter for IntensitySeries*
- *Intensity series wireframe. This was included in 2.1.0 release but was missing from the changelog. Changelog for 2.1.0 has also been updated to include this change.*

Changed
- *Major improvements to 3D Point Series and 3D Line Series performance*
- *Improved 3D Box Series performance*
- *Improved Axis3D tick and grid line rendering performance*
- *General performance improvements*
- *Tweaked Axis3D joint style with thick line style*
- *Inconsistent RangeSeries max point count value to be consistent (0) with other series types.*
- *Improved default Chart3D camera behavior to fit data into visible viewport better*
- *Improved default themes paletted color behavior*
- *Improved 3D Line Series visual style*
- *Added 'shape' option to PointStyle3D.Triangulated for changing 3D points shape during runtime.*
- *Tweaked themes*

Fixed
- *3D theme inconsistencies*
- *Axis.setScrollStrategy TS type not accepting undefined*
- *IntensitySeries zooming and panning did unnecessary calculation*

Deprecated
- *Theme.numericTickStrategy3D use Theme.numericTickStrategy instead.*
- *Theme.dateTimeTickStrategy3D use Theme.dateTimeTickStrategy instead.*
- *ChartXY.setChartBackgroundFillStyle renamed to setSeriesBackgroundFillStyle*
- *ChartXY.setChartBackgroundStrokeStyle renamed to setSeriesBackgroundStrokeStyle*
- *PointSeries3D 'pointShape' initialization configuration. Use PointSeries3D.setPointStyle instead.*
- *PointLineSeries3D 'pointShape' initialization configuration. Use PointLineSeries3D.setPointStyle instead.*

[2.1.0] - 2020-11-30

Added
- *3D Surface Series*
- *3D Box Series*
- *Added 3D Tick gridlines.*
- *Heatmap cursor support*
- *Custom Theme API to create your own Themes.*
    - *customSimpleTheme()*
    - *customComplexTheme()*
    - *customTheme()*
- *New themes*
    - *AuroraBorealis*
    - *BlueSciFi*
    - *Classy*
    - *DarkGradient*
    - *Lavender*
    - *LavenderGradient*
    - *LightGradient*
    - *Lipstick*
    - *Monochrome*
    - *Night*
    - *Raspberry*
    - *Sunset*
- *Series.onHighlight / Series.offHighlight*
- *Axis.getInterval() method for retrieving the currently applied axis scale interval.*
- *Added vec3utils. A collection of 3-dimensional vector math functions.*
- *Intensity series wireframe*

Changed
- *Highlighting a Series on a Chart also highlights corresponding Series in attached Zoom Band Chart*

Fixed
- *Fix not being able to style 3D Tick lines.*
- *Fixed error when running the charts in Node JS. (With the lcjs-headless package)*
- *Pie, Funnel and Spider charts animation speed inconsistency with ChartXY animation speed.*
- *Rendering error on first frame.*

Deprecated
- `DefaultLibraryStyle` - *Use Themes.dark or any other Theme instead.*

[2.0.3] - 2020-10-15

Fixed
- *Rendering error after chart with PointSeries had been disposed once and recreated with a new PointSeries.*

[2.0.2] - 2020-09-17

Fixed
- *Fixed issue with PointSeries in Mac systems.*
- *Fixed AutoCursor being out of sync with actual position.*
- *Fixed issues with AngularJS related to typings.*

[2.0.1] - 2020-09-07

Fixed
- *Fixed new example links in readme file*

[2.0.0] - 2020-09-04

Added
- *Add public API to get Highlighters for Axis*
- *Added onPositionChange event to ChartMarker and SeriesMarker*
- *Added more mouse and touch events to chart background*
- *layout() method to PublicEngine interface.*
- *Add LinearGradientFill and RadialGradientFill fill styles.*
- *Added Axis setTickStrategy method.*
- *Added AxisTickStrategies.Empty (replaces Axis.setTickStyle(emptyTick))*
- *Added VisibleTicks.setLabelAlignment()*
- *Chart3D*
- *Axis3D*
- *Point3D*
- *PointSeries3D*
- *PointCloudSeries3D*
- *PointStyle3D*
- *LineSeries3D*
- *PointLineSeries3D*

Changed

- *Refactored thick line rendering.*
  - *Improves the visual style of the line when a semi-transparent fill style is used.*
  - *Improves GL memory usage. Same line now takes 40 to 70% less GL memory depending on the line.*
- *PointSeries now uses faster rendering methods on supported devices.*
  - *Major performance improvement*
  - *Uses less GL memory*
- *columnSpan and rowSpan Dashboard options are now optional and default to 1.*
- *Chart options when creating a chart inside dashboard are simplified.*
  - *Options are no longer behind a separate object but are instead given in same object as the dashboard options.*
- *Reduced zooming animation duration*
- *Made transparent backgrounds possible.*
- *LightningChart JS now requires the following WebGL extensions to work properly*
  - *ANGLE_instanced_arrays*
  - *EXT_blend_minmax*
  - *OES_element_index_uint*
  - *OES_standard_derivatives*
  - *OES_vertex_array_object*
  - *WEBGL_lose_context*
  - *If any of these extensions is missing, then a dismissible warning will be shown to notify users of possibly incorrectly working features.*
- *Changed seriesBackground mouse and touch event naming to chartBackground mouse and touch events.*
  - *e.g. onSeriesBackgroundMouseDown was changed to onChartBackgroundMouseDown*
- `requestAnimationFrame` *and* `cancelAnimationFrame` *are no longer polyfilled automatically.*
  - *The methods should be polyfilled if support for environments where the methods don't exist is needed.*
- *Numeric Axis ticks have been reworked*
- *DateTime Axis ticks have been reworked*
- *Mouse and touch events are properly handled to allow normal browser interactions when chart does no action for the event*
- *Changed ColorHEX factory color syntax to follow CSS color syntax, #RRGGBB[AA]*
- *Changed default highlight behavior of Series.*
  - *Series is no longer highlighted by default when hovering over it.*
    Use `series.setHighlightOnHover()` *or* `chart.setSeriesHighlightOnHover()` *to highlight on hover.*
- *Improved styles for default themes.*

Removed

- *AxisTickStrategies.NumericWithUnits*
- *Passing AxisTickStrategy of default Axes upon creating a ChartXY*
- *Passing AxisTickStrategy as parameter of ChartXY.addAxisX() or ChartXY.addAxisY()*
- *Removed APIs that were previously marked deprecated.*
  - `Chart.setDataLabelFormater`
  - `Chart.getDataLabelFormater`
  - `Chart.setChartBackgroundStroke`
  - `Chart.getChartBackgroundStroke`
  - `Series.setMaxPointsCount`
  - `containerId option`

Fixed

- *Fix legend box item checkbox looking bad when stroke style is other than 1.*
- *Fix touch events triggering outside chart area*

[1.3.1] - 2020-05-29

Fixed

- *Inconsistent cursor style changing when moving from hovering element to hovering one element to hovering over another element.*
- *Fixed a crash when adding data to OHLCSeries*
- *Hovering over the Arction logo for long enough caused the chart to freeze itself instead of allowing clicking a link to go to the Arction website.*
- *Incorrect resolution and interactions when opening a chart in fullscreen mode*

[1.3.0] - 2020-04-28

Added

- *Heatmap*
- *ChartXY.addHeatmapSeries()*
- *IntensityGridSeries can be used for visualization of magnitude in two dimensions.*
- *IntensityMeshSeries can be used for visualization of magnitude in two dimensions, where the geometry of the series can be edited.*
- *Dashboard.createZoomBandChart()*
- *Added Axis Bands and ConstantLines.*
- *Application/Intranet Deployment key support*
- *A way to disable all animations at once.*
    - *Call* `disableAnimations()` *on any chart or specify* `disableAnimations:` *true as a chart creation option.*
- *Added series.addArrayX(), .addArrayY(), .addArrayXY() to basic Series types in XY Charts for user convenience.*
    - *These methods cause some overhead when used, so using the series.add() is still recommended for best performance.*
- *Added .addArrayY() to OHLCSeriesWithAutomaticPacking for user convenience.*
    - *This method causes some overhead when used, using .add() method is still recommended for best performance.*
- *getSeries() method to XY Charts and Spider chart.*
- *Support for rendering in Node JS environment with the help of "@arction/lcjs-headless" package.*
- `renderFrame()` *method to engine.*
- *Added getDataLabelFillStyle and setDataLabelFillStyle to SolidGauge.*

Changed

- *FitEngineToDiv.container to pass DOM Element to Engine. Users can pass either DOM Element itself, or its ID.*
- *Mouse and touch interaction handling to add support for pen and PC touch screen interactions.*
    - *All interactions still work the same way, interactions just has better support for more interaction methods.*

Fixed

- *Rendering error on some GPU's where GPU received some vertices as NaN instead of a valid vertex.*
- *Inconsistent style for SeriesMarker tick X and Y labels*
- *Fixed a TypeError on pyramid chart*
- *LightningChart JS logo failing to render correctly when high-dpi mode is used and devicePixelRatio is less than 1*
- *LightningChart JS logo duplication in LegendBoxPanel*
- *Incorrect cursor styles when hovering over axis or other element with resize cursor style*
- *PointSeries.add method requiring added points to be of* `ColorPoint` *type when* `Point` *is a valid type for it.*

Deprecated

- *Deprecated use of FitEngineToDiv.containerId in EngineOptions.*
  Use FitEngineToDiv.container instead.
- *Deprecated use of setChartBackgroundStroke in SpiderChart, ChartXY.*
  Use setChartBackgroundStrokeStyle instead.
- *Deprecated use of getChartBackgroundStroke in SpiderChart, ChartXY.*
  Use getChartBackgroundStrokeStyle instead.

[1.2.2] - 2020-01-07

Changed
- *Error message when trying to create a chart in container that doesn't exist*

Fixed
- *Mouse interactions permanently disabled when interactions disabled while interaction is in-progress*
- *Multiple Slice Explosion restriction not always working*

[1.2.1] - 2019-12-18

Fixed
- *TypeScript typings duplicate identifier*

[1.2.0] - 2019-12-10

Added
- *Added Axis Bands and ConstantLines.*
- *ColorHEX supports format with '0x' prefix.*
- *Dashboard.setSplitterStyle()*
- *Dashboard.setSplitterStyleHighlight()*
- *Dashboard.setBackgroundFillStyle()*
- *Dashboard.setBackgroundStrokeStyle()*
- *High DPI rendering support with 'devicePixelRatio' engine option*
- *Themes, with 'dark' and 'light' preset themes available.*
- *LUT (ValueRangePalette)*
- *series.getPointAmount() in XY Charts*
- *ChartXY.setMouseInteractionsWhileScrolling()*
- *ChartXY.setMouseInteractionsWhileZooming()*
- *New option when creating lines: highlightThicknessMultiplier can be used to specify thickness of highlighted lines*
- *Progressive DataPatterns precision*

Changed
- *Chart examples linked in the readme*
- *Mouse interactions are disabled by default when scrolling / zooming. This behavior can be changed with methods in XY Charts.*

Fixed
- *GL errors with Pyramid Chart*
- *AutoCursor working incorrectly with touch displays*

[1.1.1] - 2019-10-11

Changed
- *Chart examples linked in the readme*

Fixed
- *Typo in the readme*
- *Missing typings*
- *Performance issue found in the trading showcase*

[1.1.0] - 2019-10-03

Added
- *Dispose API for Charts, Dashboard*
- *Add OHLCSeries.set/getFigureAutofitting()*

Changed
- *Removed dependency to crc package.*
- *Removed dependency to collections package.*

Deprecated
- *SolidGauge.setDataLabelFormater in favor of SolidGauge.setDataLabelFormatter*
- *SolidGauge.getDataLabelFormater in favor of SolidGauge.getDataLabelFormatter*
- *OHLCSeries.setMaxPointsCount in favor of OHLCSeries.setMaxPointCount*

Fixed
- *Fixed crash when adding points to step series.*
- *PointableTextBox incompatibility with axis custom tick.*
- *Empty StrokeStyle not working with Axis Nibs*

[1.0.3] - 2019-08-26

Added
- *More keywords for npm*

Changed
- *Readme file contents present the package better*

[1.0.1] - 2019-08-14

Added
- *CHANGELOG.md included in the npm package*
- *More keywords for npm*

Fixed
- *Pyramid Chart*
    - *Added missing API documentation for get/setAnimationsEnabled*
- *Funnel Chart*
    - *Added missing API documentation for get/setAnimationsEnabled*

[1.0.0] - 2019-08-05

Added

- *2-Dimensional Charts*
    - *o ChartXY (Cartesian Chart)*
        - *- Line Series*
        - *- Point Series*
        - *- Point Line Series*
        - *- Spline Series*
        - *- Step Series*
        - *- Rectangle Series*
        - *- Ellipse Series*
        - *- Box Series*
        - *- OHLC Series*
        - *- Area Series (BiPolar, Monopolar, AreaRange)*
        - *- Axes*
    - *o Spider Chart*
    - *o Pie Chart*
    - *o Gauge Chart*
    - *o Funnel Chart*
    - *o Pyramid Chart*
- *Markers (for Series / Chart)*
- *Cursor*
- *Mouse Interactions*
- *Touch Support*
- *Animations*
- *Dashboard*
- *LegendBox*
- *UI Elements (Buttons, CheckBoxes, Labels, TextBoxes)*