LightningChart®

CHANGE LOG.

➡ All notable changes to this project will be documented in this file.

➡ The format is based on <u>Keep a ChangeLog</u>, and this project adheres to <u>Semantic Versioning</u>.

📅 [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.

📅 [3.1.0] - 2021-07-28

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

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📅 [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*

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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*
  - *o Chart3D.setSeriesBackgroundFillStyle*
  - *o Chart3D.setSeriesBackgroundStrokeStyle*
• *3D BoundingBox style API*
  - *o Chart3D.setBoundingBoxStrokeStyle*
  - *o Chart3D.getBoundingBoxStrokeStyle*
• *3D camera behavior control*
  - *o Chart3D.setCameraAutomaticFittingEnabled*
  - *o Chart3D.getCameraAutomaticFittingEnabled*
• *New color palettes for palettes that match with the themes added in 2.1.0*
  - *o auroraBorealis*
  - *o blueSciFi*
  - *o light*
  - *o monochrome*
  - *o night*
  - *o 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.*
  - *o customSimpleTheme()*
  - *o customComplexTheme()*
  - *o customTheme()*
- *New themes*
  - *o AuroraBorealis*
  - *o BlueSciFi*
  - *o Classy*
  - *o DarkGradient*
  - *o Lavender*
  - *o LavenderGradient*
  - *o LightGradient*
  - *o Lipstick*
  - *o Monochrome*
  - *o Night*
  - *o Raspberry*
  - *o 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*

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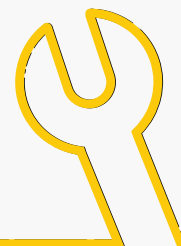
Changed
• *Highlighting a Series on a Chart also highlights corresponding Series in attached Zoom Band Chart*

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*
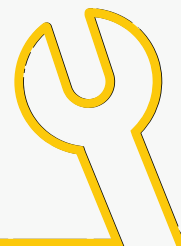
Changed
- *Refactored thick line rendering.*
    - *o Improves the visual style of the line when a semi-transparent fill style is used.*
    - *o Improves GL memory usage. Same line now takes 40 to 70% less GL memory depending on the line.*
- *PointSeries now uses faster rendering methods on supported devices.*
    - *o Major performance improvement*
    - *o 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.*
    - *o 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*
    - *o ANGLE_instanced_arrays*
    - *o EXT_blend_minmax*
    - *o OES_element_index_uint*
    - *o OES_standard_derivatives*
    - *o OES_vertex_array_object*
    - *o WEBGL_lose_context*
    - *o 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.*
    - *o e.g. onSeriesBackgroundMouseDown was changed to onChartBackgroundMouseDown*
- `requestAnimationFrame` *and* `cancelAnimationFrame` *are no longer polyfilled automatically.*
    - *o 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.*
    - *o 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.*
    - *o* `Chart.setDataLabelFormater`
    - *o* `Chart.getDataLabelFormater`
    - *o* `Chart.setChartBackgroundStroke`
    - *o* `Chart.getChartBackgroundStroke`
    - *o* `Series.setMaxPointsCount`
    - *o* `containerId option`

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

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📅 [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.*
    - o *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.*
    - o *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.*
    - o *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.*
    - o *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.*

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📅 [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*

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📅 [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*
    o *Added missing API documentation for get/setAnimationsEnabled*
• *Funnel Chart*
    o *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)*