A VISUAL REFERENCE · Data visualization comparison

Data visualization comparison, one dataset, five tools

Twelve visual questions. Sixty complete programs. Actual vector output from PGFplots / TikZ, gnuplot, Asymptote, MetaPost and GMT.

Follow the same people through counts, rates, distributions and age-by-group views. Every row of the comparison uses shared numeric input, fixed scales and the same statistical definition. The native tools retain their own drawing APIs and typography.

> **Last changes: 2026-10-31.** Readable, linted source across all five tools, using the verified Titanic archive, version 1.0.1.

60
worked examples

12
topic families

1
canonical Org source

READING THE TOUR

Compare a result, then reproduce it

Choose a question

Each chapter starts with five outputs. Read across the tools before opening their drawing commands.

Keep the definition fixed

Shared tables fix denominators, bins, quartiles, tied ages, smoothing and circle areas. Font metrics and native export paths can differ.

Run the native program

Download a source-and-data ZIP, unpack it and run the command in its README. Every figure PDF also embeds its complete program and plotting inputs.

The focused source shows data loading and drawing. Expand the complete program for canvas setup, imports, colours, axis helpers and output commands. PDF readers see the focused source and captured result; the HTML includes the full source and logs. The tour PDF also embeds the complete data and preparation kit, including the original CSV and all derived tables. The paired tool tours provide broader syntax references.

Data, provenance and reproducibility

The collection DOI 10.5281/zenodo.22967792 resolves to the pinned release 10.5281/zenodo.22983324, version 1.0.1, published 26 September 2026 by Lukas C. Bossert. The archived teaching snapshot contains 2,207 people: 1,317 passengers and 890 crew, with 711 survivors and 1,496 non-survivors. Crew is a separate group alongside the three passenger classes. Recorded female and male categories include children. Two ages are missing; age plots use 2,205 people. Identical rows are retained because they can represent different people.

The person table's SHA-256 is `ab8e88d421a6d1cd54f12c5660f425c21c780e2186652894d8b9c9f740d78650`. All six original files are preserved under data/source/. The preparation script checks the archive's MD5 and SHA-256 digests, recomputes summaries, checks them against all four archived summaries and writes deterministic tables. Run `python3 scripts/prepare-data.py --check` to verify them. recipes.json records every column, range and statistical convention. The data dictionary explains the numeric files. No plotting tool chooses its own estimator or bin edges here.

The raw data and its derivatives retain the archive's No Limit Public License; see data attribution and full NLPL text. Original tour prose and programs use CC0; the publishing framework retains its CC BY attribution. This historical teaching snapshot supports descriptive comparisons, not causal claims about survival.

Choosing a tool

PGFplots supplies table-driven axes, prepared boxplots and group plots inside TeX; TikZ fills the grid cells and circles. gnuplot supplies compact column expressions, boxes, candlesticks, filled curves and variable colour. Asymptote combines typed arrays, paths, pens and composable pictures. MetaPost expresses geometry and colour interpolation with paths, tables and TeX labels. GMT pipes selected columns into native bar, box-and-whisker, polygon and symbol modules and manages panels with subplot.

These examples compare source patterns and results. They do not rank speed or claim pixel-identical typography. Computing the statistics once makes differences in the graphics APIs visible. A separate exercise could compare the tools' native statistical defaults, which would answer a different question.

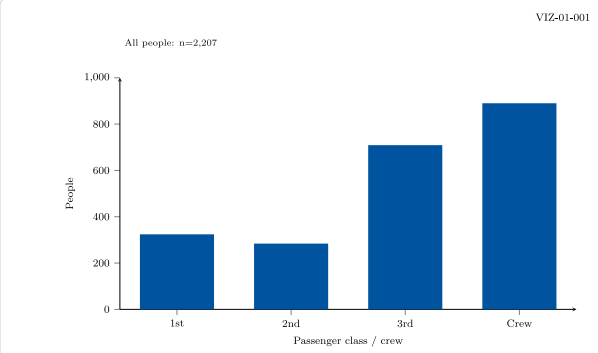
The full build requires Python 3, TeX Live with PGFplots, gnuplot, Asymptote, MetaPost, GMT, Ghostscript, Poppler and librsvg. It runs the reviewed local programs in isolated working directories without network access. A standalone bundle needs only its own engine: `pdflatex`, `gnuplot`, `asy`, `mpost` or `bash` plus GMT/Ghostscript. MetaPost's standalone program emits native SVG; the publisher uses librsvg to make its PDF. Other engines emit PDF; Poppler creates their SVG previews. All sixty figures have PNG, SVG and PDF downloads.

References

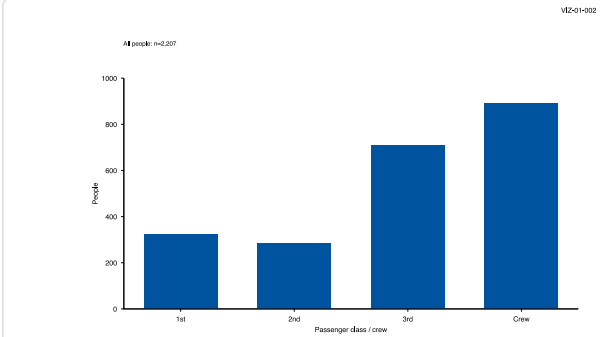
Consult the PGFplots manual, gnuplot documentation, Asymptote manual, MetaPost documentation and GMT documentation for native options. The shared input files and full programs make every comparison independent of web access after download.

People aboard by class and crew

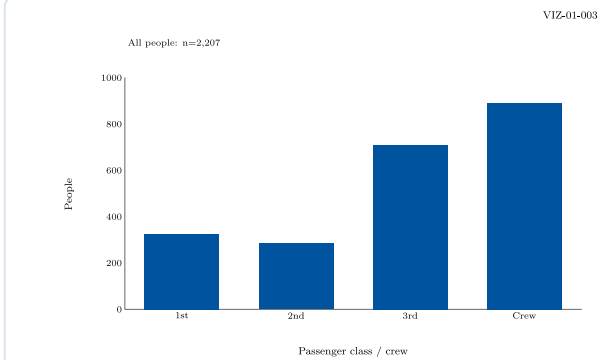
All 2,207 people; counts include unknown ages.



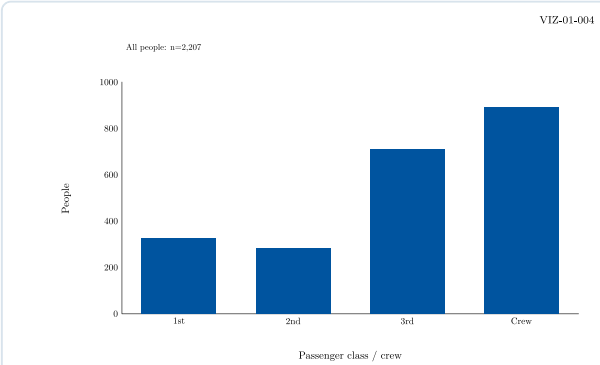
PGFplots / TikZ
VIZ-01-001



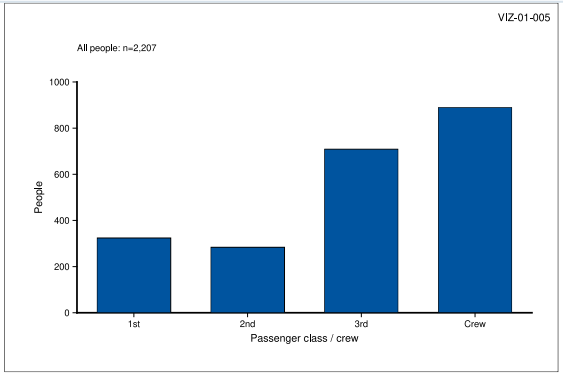
gnuplot
VIZ-01-002



Asymptote
VIZ-01-003



MetaPost
VIZ-01-004



GMT
VIZ-01-005

VIZ-01-001

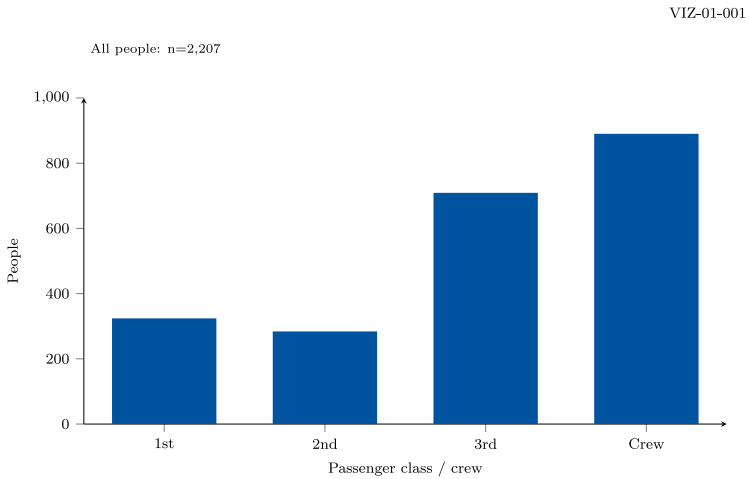
PGFplots / TikZ: counts

PGFplots reads the shared count column and draws bars on fixed axes.

Drawing commands

```
\pgfplotstableread{data/classes.tsv}\Data
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0.5,
    xmax=4.5, ymin=0,
    ymax=1000, xtick={1,2,3,4},
    ytick={0,200,400,600,800,1000}, xlabel={Passenger class / crew},
    ylabel={People}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false, xticklabels={1st,2nd,3rd,Crew}
]
  \addplot[ybar,bar shift=0pt,bar width=56bp,fill=Blue,draw=none]
  table[x index=0,y index=1]{data/classes.tsv};
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-01-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`table + ybar`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-01-002

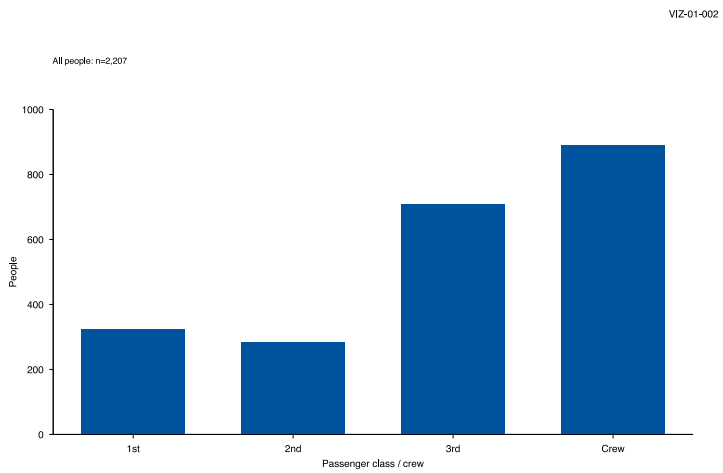
gnuplot: counts

Column selection and absolute box width produce the count chart.

Drawing commands

```
set boxwidth .65 absolute
plot "data/classes.tsv" using 1:2 with boxes lc rgb "#00549f"
```

Actual gnuplot output



VIZ-01-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`using 1:2 with boxes`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-01-003

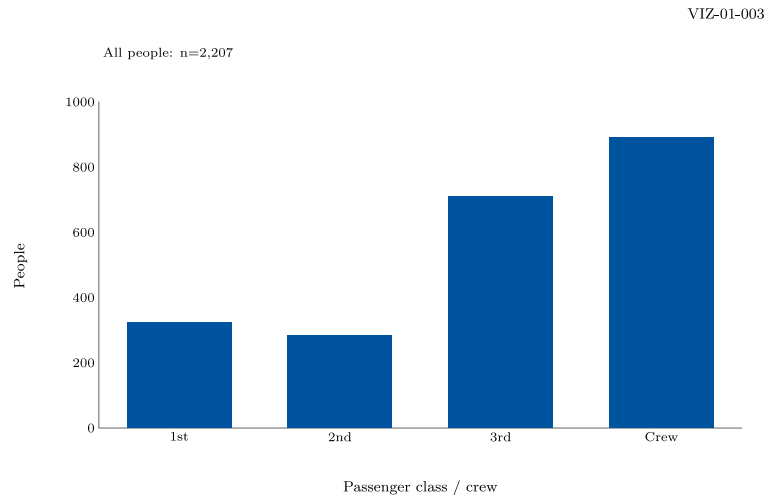
Asymptote: counts

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
real[][] d = input("data/classes.tsv").line();
for (int i = 0; i < d.length; ++i) {
    real[] v = d[i];
    rect(v[0] - .325, 0, v[0] + .325, v[1], Blue);
}
```

Actual Asymptote output



VIZ-01-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-01-004

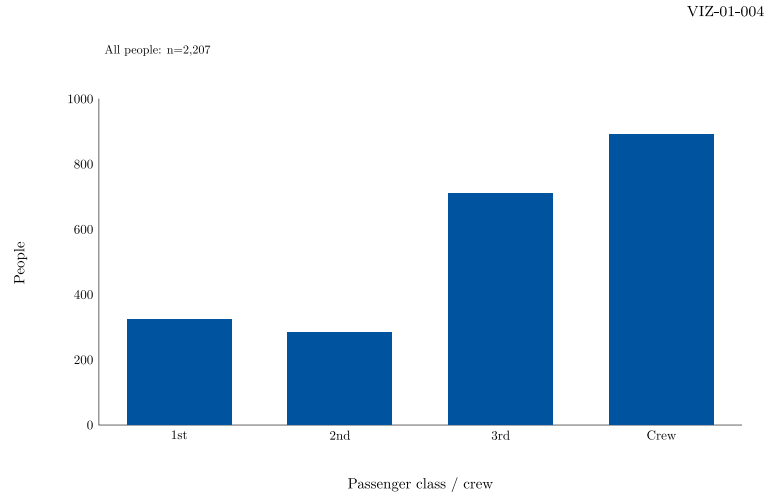
MetaPost: counts

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/classes.tsv", c,
    n := n + 1;
    for j = 1 upto 12:
        v[n][j] := scantokens c[j];
    endfor
);
for k = 1 upto n:
    rect(v[k][1] - .325, 0, v[k][1] + .325, v[k][2], Blue);
endfor
```

Actual MetaPost output



VIZ-01-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-01-005

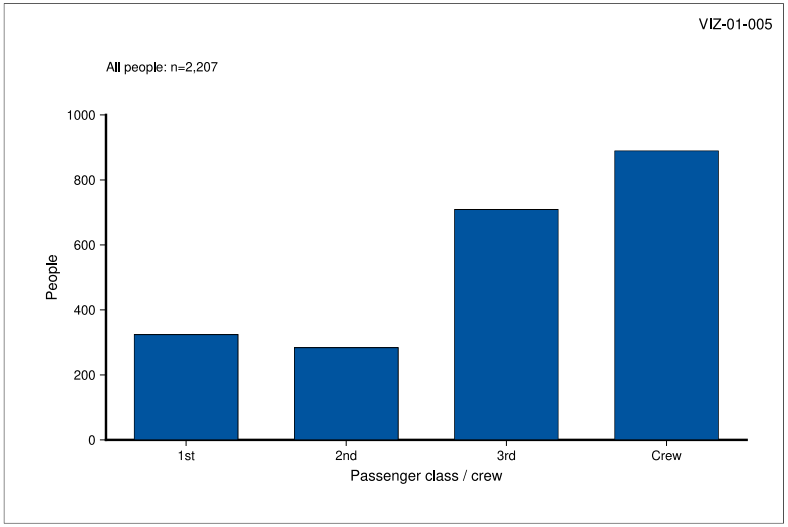
GMT: counts

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
gmt plot data/classes.tsv -i0,1 -Sb56p+b0 -G#00549f -W0p
```

Actual GMT output



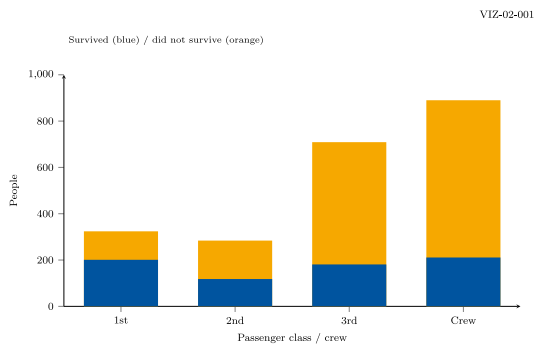
VIZ-01-005 · native vector output

GMT · exit 0

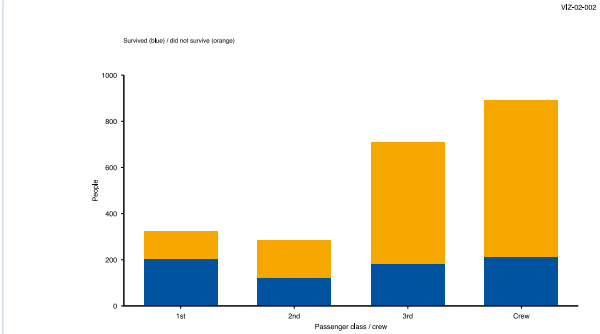
Command or choice	Meaning
`plot -Sb`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

Stacked survival counts

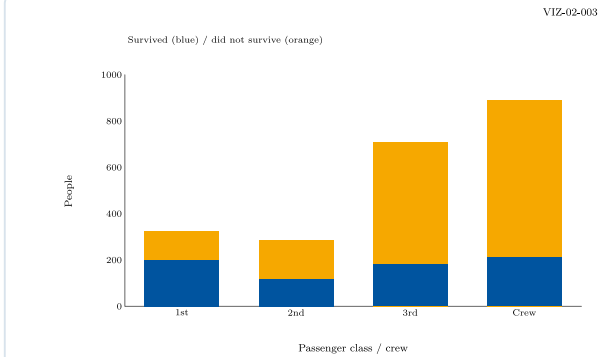
Survived plus did not survive equals each group total.



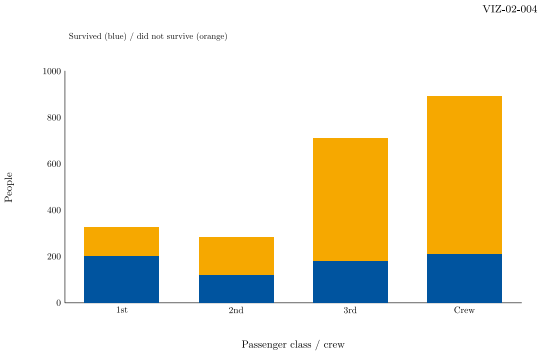
PGFplots / TikZ
VIZ-02-001



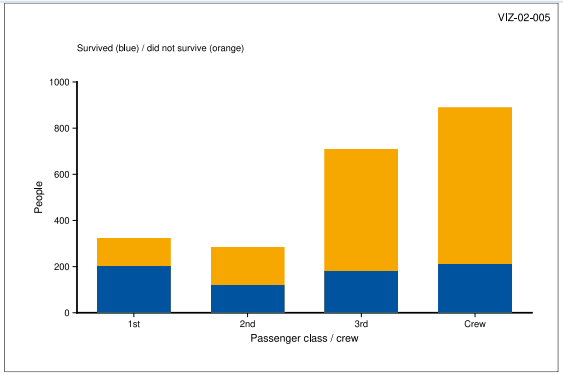
gnuplot
VIZ-02-002



Asymptote
VIZ-02-003



MetaPost
VIZ-02-004



GMT
VIZ-02-005

VIZ-02-001

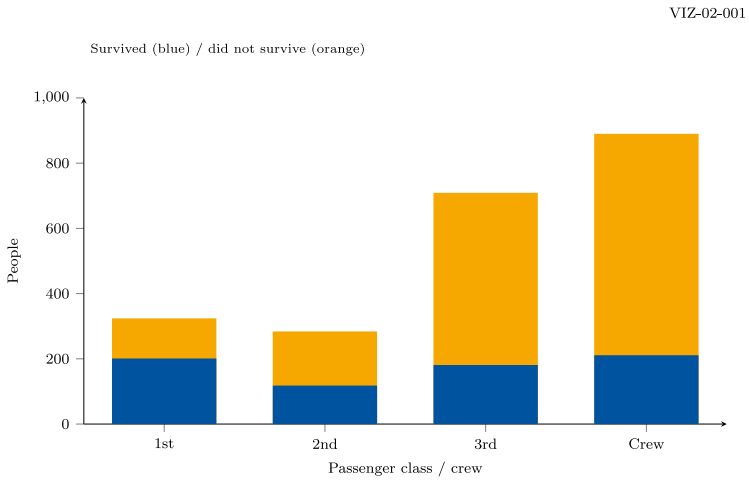
PGFplots / TikZ: stacked

The orange total forms the top and the blue survivor count forms the lower segment.

Drawing commands

```
\pgfplotstableread{data/classes.tsv}\Data
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0.5,
    xmax=4.5, ymin=0,
    ymax=1000, xtick={1,2,3,4},
    ytick={0,200,400,600,800,1000}, xlabel={Passenger class / crew},
    ylabel={People}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false, xticklabels={1st,2nd,3rd,Crew}
]
  \addplot[ybar,bar shift=0pt,bar width=56bp,fill=Orange,draw=none]
  table[x index=0,y index=1]{data/classes.tsv};
  \addplot[ybar,bar shift=0pt,bar width=56bp,fill=Blue,draw=none]
  table[x index=0,y index=2]{data/classes.tsv};
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-02-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`two ybar layers`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-02-002

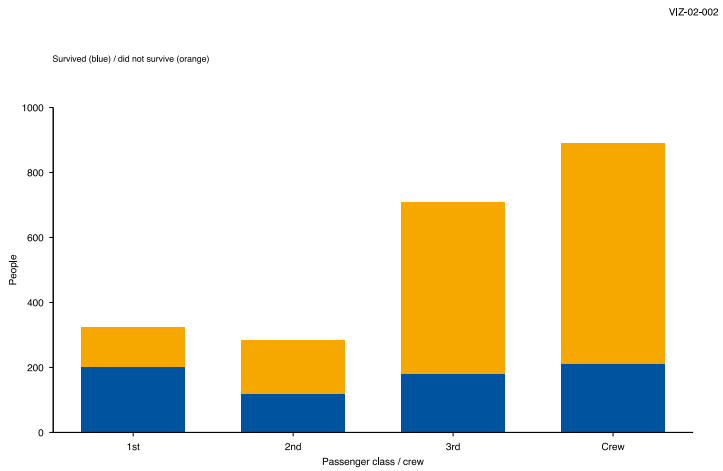
gnuplot: stacked

Draw the total in orange, then the survivor count in blue; the remaining upper segment equals non-survivors.

Drawing commands

```
set boxwidth .65 absolute
plot "data/classes.tsv" using 1:2 \
        with boxes lc rgb "#f6a800", \
     "" using 1:3 \
        with boxes lc rgb "#00549f"
```

Actual gnuplot output



VIZ-02-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`overlay boxes`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-02-003

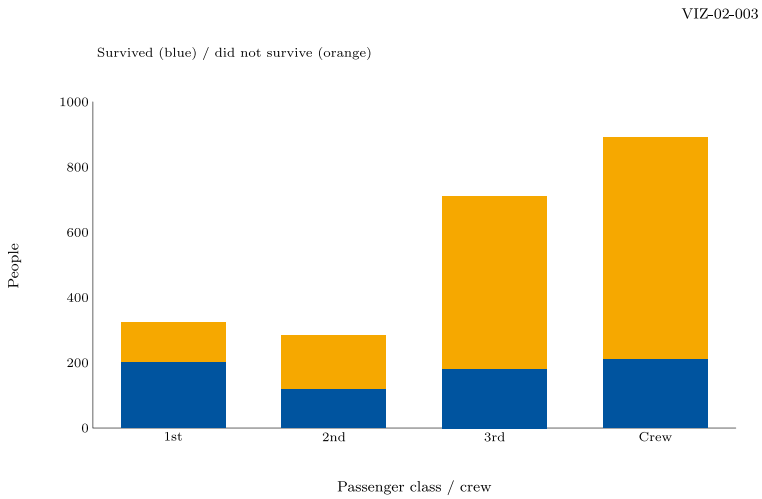
Asymptote: stacked

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
real[][] d = input("data/classes.tsv").line();
for (int i = 0; i < d.length; ++i) {
    real[] v = d[i];
    rect(v[0] - .325, 0, v[0] + .325, v[1], Orange);
    rect(v[0] - .325, 0, v[0] + .325, v[2], Blue);
}
```

Actual Asymptote output



VIZ-02-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-02-004

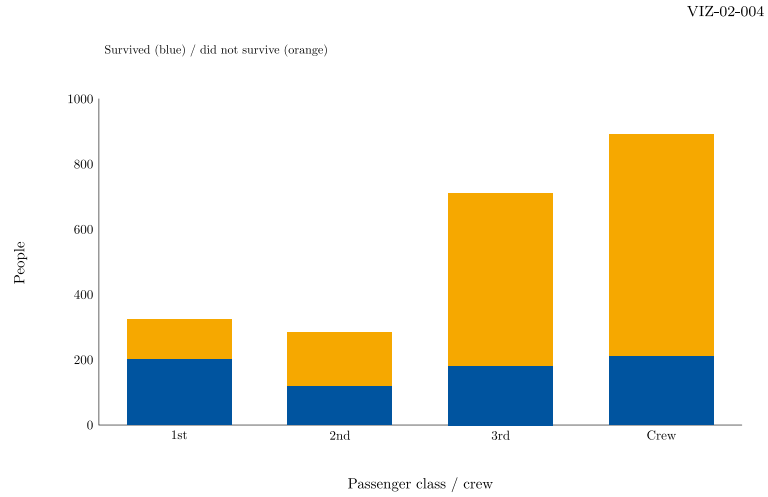
MetaPost: stacked

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/classes.tsv", c,
    n := n + 1;
    for j = 1 upto 12:
        v[n][j] := scantokens c[j];
    endfor
);
for k = 1 upto n:
    rect(v[k][1] - .325, 0, v[k][1] + .325, v[k][2], Orange);
    rect(v[k][1] - .325, 0, v[k][1] + .325, v[k][3], Blue);
endfor
```

Actual MetaPost output



VIZ-02-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-02-005

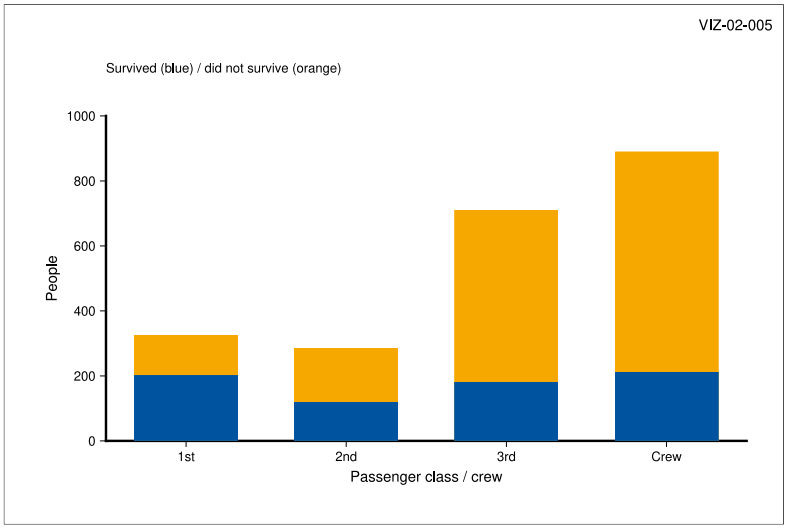
GMT: stacked

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
gmt plot data/classes.tsv -i0,1 -Sb56p+b0 -G#f6a800
gmt plot data/classes.tsv -i0,2 -Sb56p+b0 -G#00549f
```

Actual GMT output



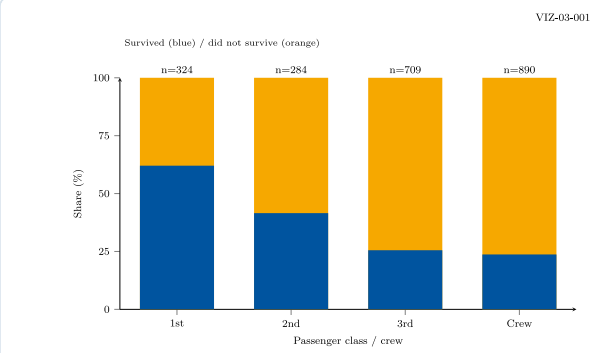
VIZ-02-005 · native vector output

GMT · exit 0

Command or choice	Meaning
`layered plot -Sb`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

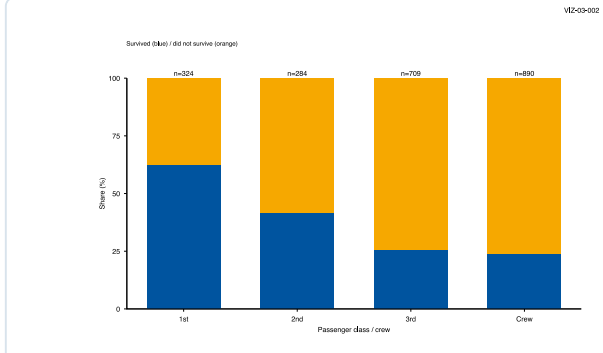
Survival proportions within groups

Each bar has its own class/crew denominator; n labels retain group sizes.



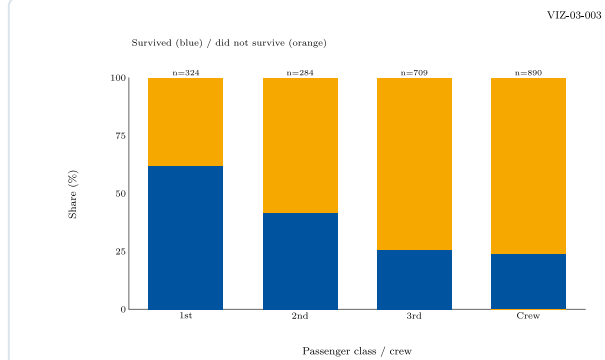
PGFplots / TikZ

VIZ-03-001



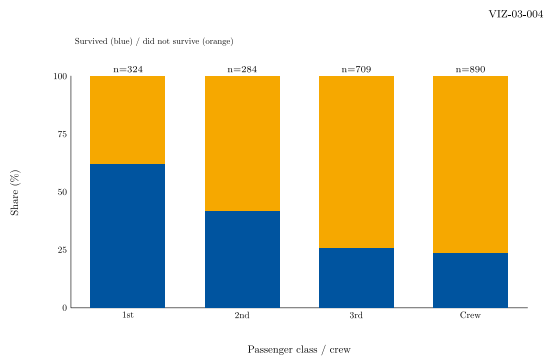
gnuplot

VIZ-03-002



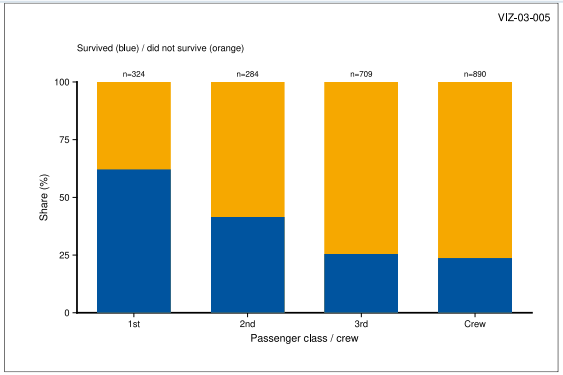
Asymptote

VIZ-03-003



MetaPost

VIZ-03-004



GMT

VIZ-03-005

VIZ-03-001

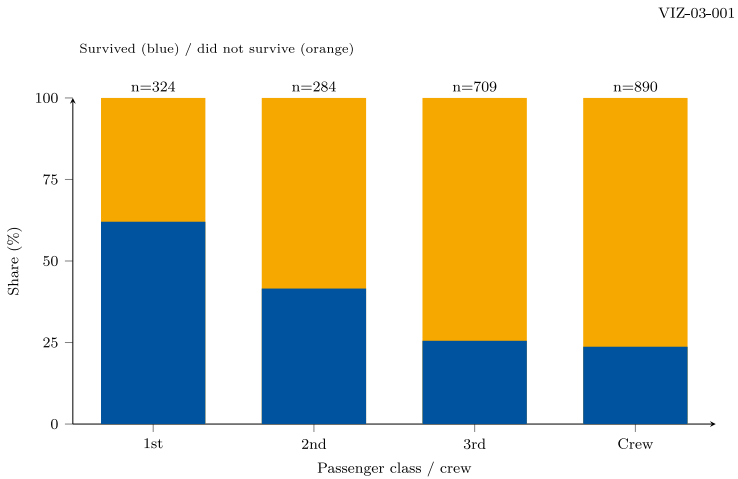
PGFplots / TikZ: proportions

A constant 100-percent background and the shared survival rates retain each denominator as a label.

Drawing commands

```
\pgfplotstableread{data/classes.tsv}\Data
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0.5,
    xmax=4.5, ymin=0,
    ymax=100, xtick={1,2,3,4},
    ytick={0,25,50,75,100}, xlabel={Passenger class / crew},
    ylabel={Share (\%)}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false, xticklabels={1st,2nd,3rd,Crew}
]
  \addplot[ybar,bar shift=0pt,bar width=56bp,fill=Orange,draw=none]
  table[x index=0,y expr=100]{data/classes.tsv};
  \addplot[ybar,bar shift=0pt,bar width=56bp,fill=Blue,draw=none]
  table[x index=0,y index=4]{data/classes.tsv};
  \addplot[
    only marks,
    mark=none,
    nodes near coords={
      n=\pgfmathprintnumber[fixed,precision=0]{\pgfplotspointmeta}},
    point meta=explicit
  ]
  table[x index=0,y expr=100,meta index=1]{data/classes.tsv};
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-03-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`y expr + nodes near coords`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-03-002

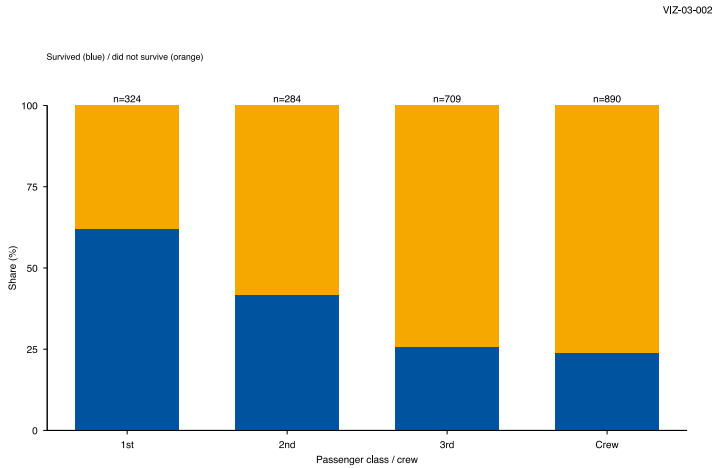
gnuplot: proportions

The 100-percent base, survival column and denominator labels create a normalized comparison.

Drawing commands

```
set boxwidth .65 absolute
plot "data/classes.tsv" using 1:(100) \
        with boxes lc rgb "#f6a800", \
     "" using 1:5 \
        with boxes lc rgb "#00549f", \
     "" using 1:(100):(sprintf("n=%d", $2)) \
        with labels offset 0, .7
```

Actual gnuplot output



VIZ-03-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`using expressions + labels`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-03-003

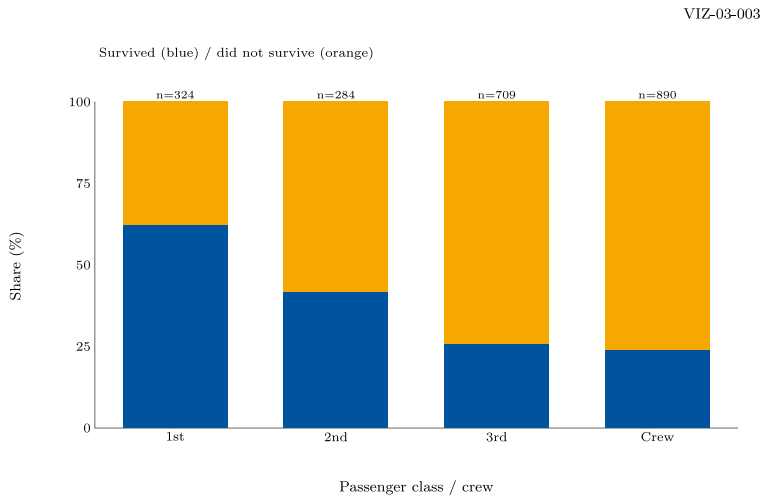
Asymptote: proportions

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
real[][] d = input("data/classes.tsv").line();
for (int i = 0; i < d.length; ++i) {
    real[] v = d[i];
    rect(v[0] - .325, 0, v[0] + .325, 100, Orange);
    rect(v[0] - .325, 0, v[0] + .325, v[4], Blue);
    label("n="+string((int)v[1]), P(v[0], 100), N, fontsize(6));
}
```

Actual Asymptote output



VIZ-03-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-03-004

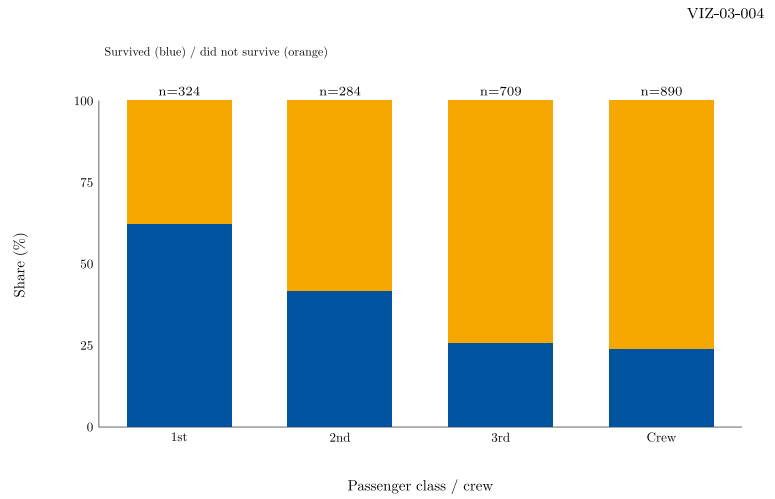
MetaPost: proportions

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/classes.tsv", c,
    n := n + 1;
    for j = 1 upto 12:
        v[n][j] := scantokens c[j];
    endfor
);
for k = 1 upto n:
    rect(v[k][1] - .325, 0, v[k][1] + .325, 100, Orange);
    rect(v[k][1] - .325, 0, v[k][1] + .325, v[k][5], Blue);
    label.top(("n=" & decimal v[k][2]) infont "cmr7", P(v[k][1], 100));
endfor
```

Actual MetaPost output



VIZ-03-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-03-005

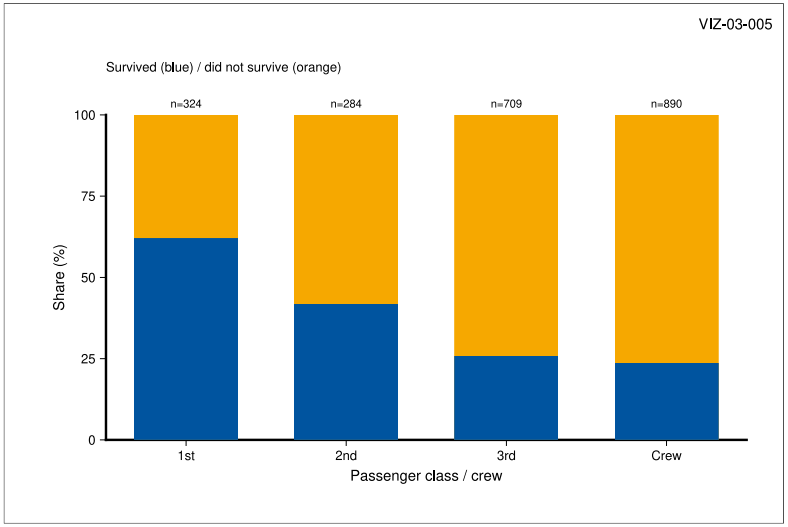
GMT: proportions

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
awk '{print $1,100}' data/classes.tsv | gmt plot -Sb56p+b0 -G#f6a800
gmt plot data/classes.tsv -i0,4 -Sb56p+b0 -G#00549f
awk '{print $1,100,"n=" $2}' data/classes.tsv | gmt text -F+f6p+jBC -D0/4p -N
```

Actual GMT output



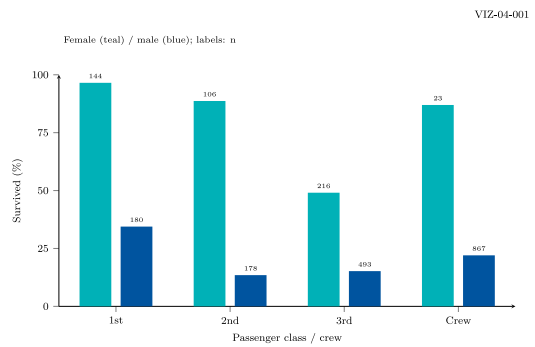
VIZ-03-005 · native vector output

GMT · exit 0

Command or choice	Meaning
`awk + plot -Sb + text`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

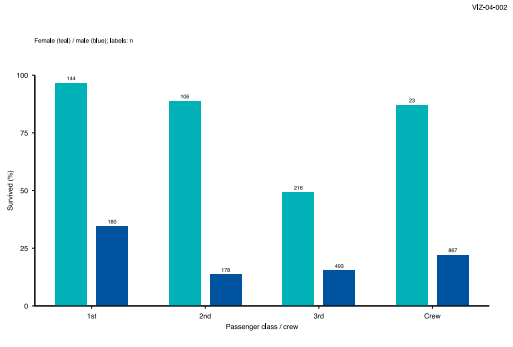
Survival by recorded sex and group

Female and male categories include children. Labels show the eight denominators, including only 23 female crew.



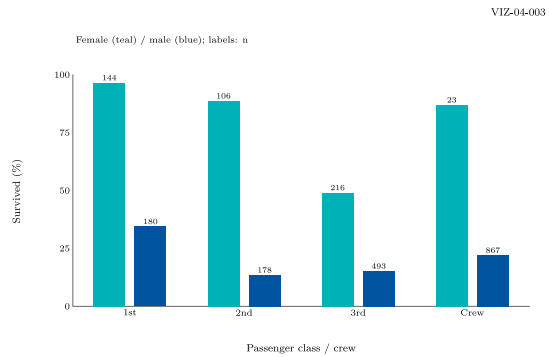
PGFplots / TikZ

VIZ-04-001



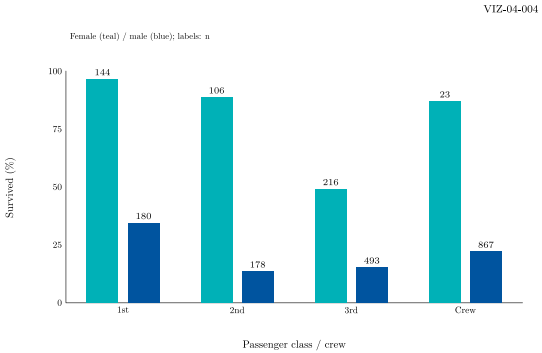
gnuplot

VIZ-04-002



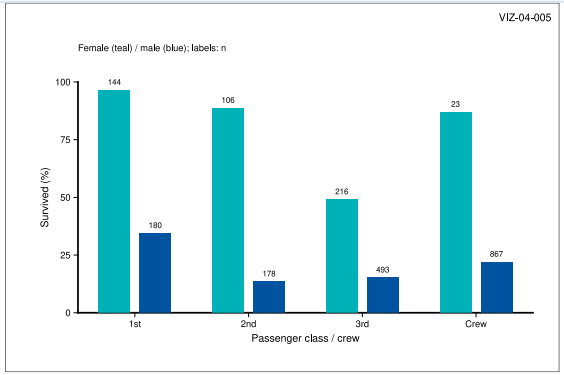
Asymptote

VIZ-04-003



MetaPost

VIZ-04-004



GMT

VIZ-04-005

VIZ-04-001

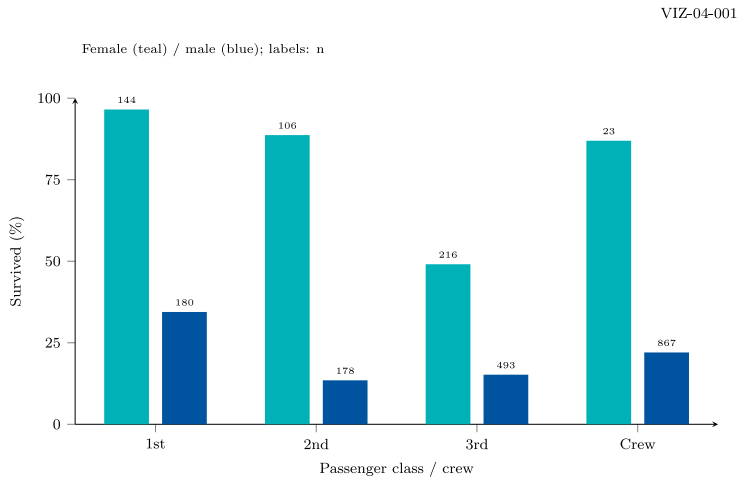
PGFplots / TikZ: grouped

Column expressions offset the two series; metadata labels show their separate denominators.

Drawing commands

```
\pgfplotstableread{data/classes.tsv}\Data
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0.5,
    xmax=4.5, ymin=0,
    ymax=100, xtick={1,2,3,4},
    ytick={0,25,50,75,100}, xlabel={Passenger class / crew},
    ylabel={Survived (\%)}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false, xticklabels={1st,2nd,3rd,Crew}
]
  \addplot[
    ybar,
    bar shift=0pt,
    bar width=24bp,
    fill=Teal,
    draw=none,
    nodes near coords={\pgfmathprintnumber[fixed,precision=0]{\pgfplotspointmeta}},
    point meta=explicit,
    every node near coord/.append style={font=\tiny}
  ]
  table[x expr=\thisrowno{0}+(-0.18),y index=7,meta index=5]{data/classes.tsv};
  \addplot[
    ybar,
    bar shift=0pt,
    bar width=24bp,
    fill=Blue,
    draw=none,
    nodes near coords={\pgfmathprintnumber[fixed,precision=0]{\pgfplotspointmeta}},
    point meta=explicit,
    every node near coord/.append style={font=\tiny}
  ]
  table[x expr=\thisrowno{0}+(0.18),y index=10,meta index=8]{data/classes.tsv};
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-04-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`x expr + explicit metadata`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-04-002

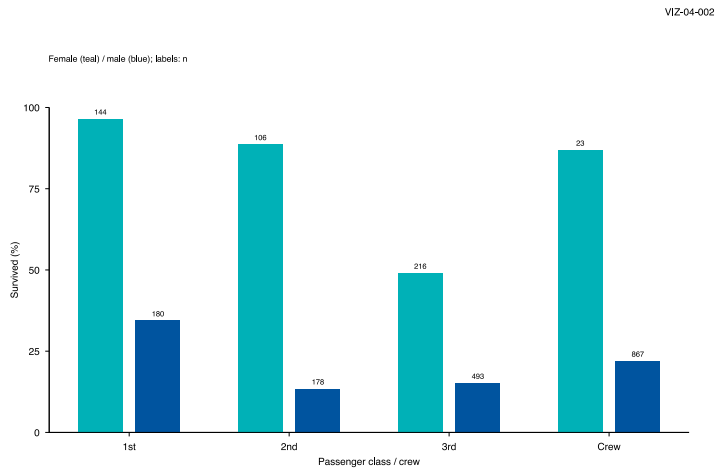
gnuplot: grouped

Offset female and male rates to either side of the class centre; keep n visible.

Drawing commands

```
set boxwidth .28 absolute
plot "data/classes.tsv" using ($1 - .18):8 \
        with boxes lc rgb "#00b1b7", \
     "" using ($1 + .18):11 \
        with boxes lc rgb "#00549f", \
     "" using ($1 - .18):8:(sprintf("%d", $6)) \
        with labels offset 0, .7 font ",6", \
     "" using ($1 + .18):11:(sprintf("%d", $9)) \
        with labels offset 0, .7 font ",6"
```

Actual gnuplot output



VIZ-04-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`using shifted columns`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-04-003

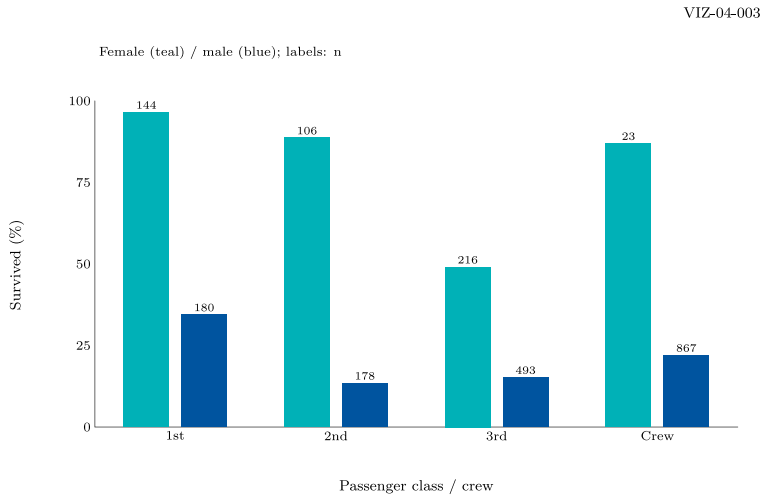
Asymptote: grouped

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
real[][] d = input("data/classes.tsv").line();
for (int i = 0; i < d.length; ++i) {
    real[] v = d[i];
    rect(v[0] - .32, 0, v[0] - .04, v[7], Teal);
    rect(v[0] + .04, 0, v[0] + .32, v[10], Blue);
    label(string((int)v[5]), P(v[0] - .18, v[7]), N, fontsize(6));
    label(string((int)v[8]), P(v[0] + .18, v[10]), N, fontsize(6));
}
```

Actual Asymptote output



VIZ-04-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-04-004

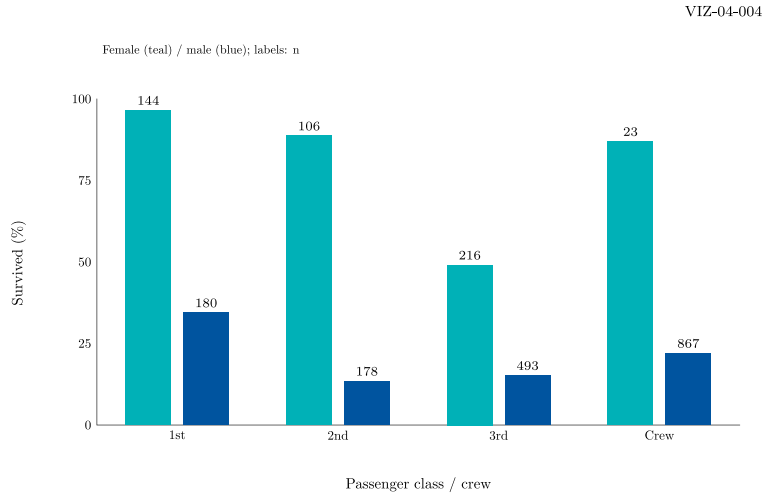
MetaPost: grouped

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/classes.tsv", c,
    n := n + 1;
    for j = 1 upto 12:
        v[n][j] := scantokens c[j];
    endfor
);
for k = 1 upto n:
    rect(v[k][1] - .32, 0, v[k][1] - .04, v[k][8], Teal);
    rect(v[k][1] + .04, 0, v[k][1] + .32, v[k][11], Blue);
    label.top(decimal v[k][6] infont "cmr7", P(v[k][1] - .18, v[k][8]));
    label.top(decimal v[k][9] infont "cmr7", P(v[k][1] + .18, v[k][11]));
endfor
```

Actual MetaPost output



VIZ-04-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-04-005

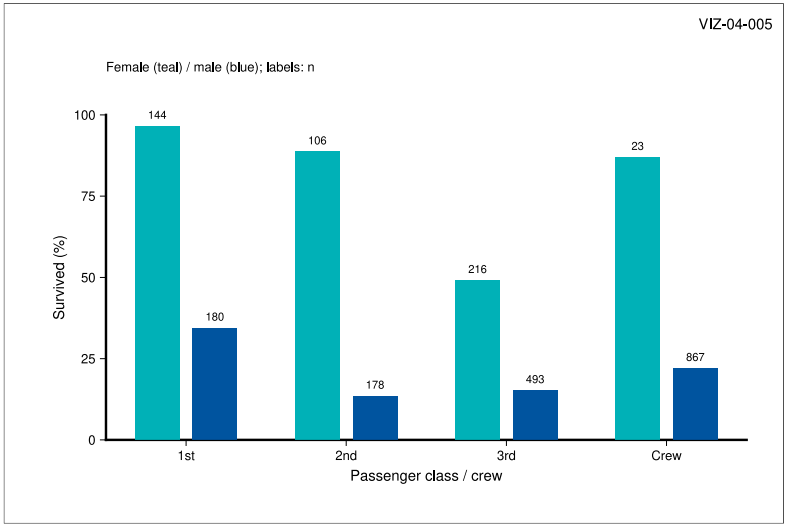
GMT: grouped

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
awk '{print $1-.18,$8}' data/classes.tsv | gmt plot -Sb24p+b0 -G#00b1b7
awk '{print $1+.18,$11}' data/classes.tsv | gmt plot -Sb24p+b0 -G#00549f
awk '{print $1-.18,$8,$6}' data/classes.tsv | gmt text -F+f6p+jBC -D0/4p -N
awk '{print $1+.18,$11,$9}' data/classes.tsv | gmt text -F+f6p+jBC -D0/4p -N
```

Actual GMT output



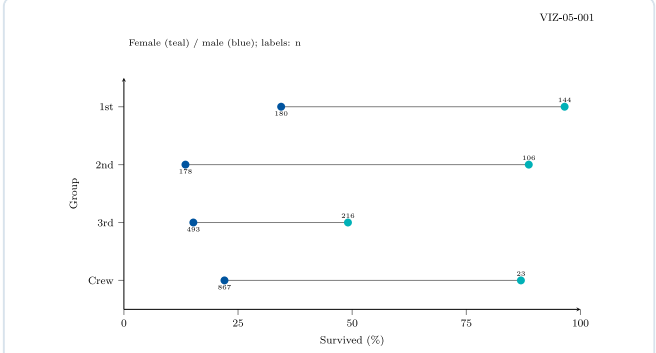
VIZ-04-005 · native vector output

GMT · exit 0

Command or choice	Meaning
`offset bars + text`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

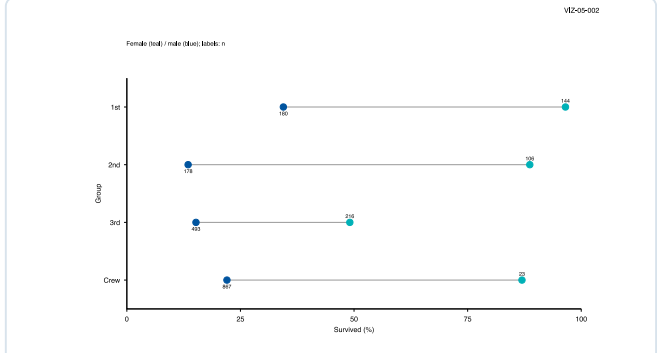
A dumbbell comparison of survival

The same eight rates as the grouped bars, joined within each group. Dots do not imply a causal effect.



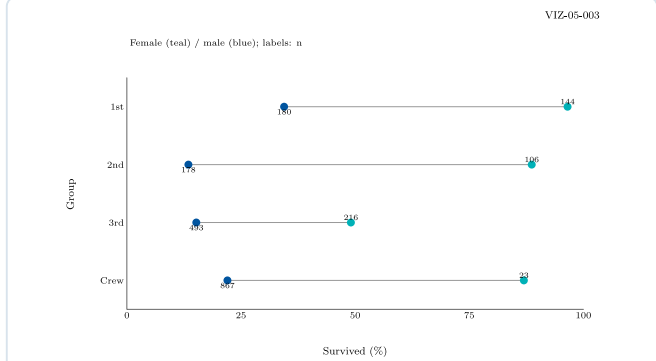
PGFplots / TikZ

VIZ-05-001



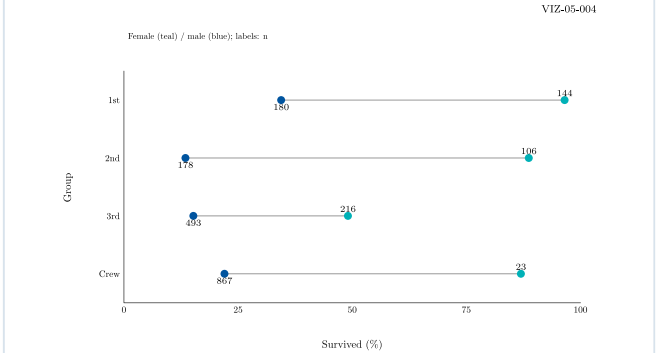
gnuplot

VIZ-05-002



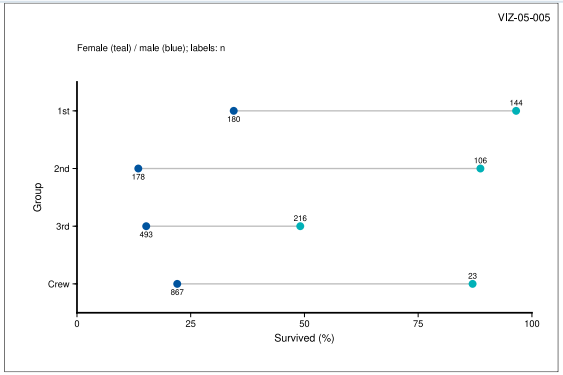
Asymptote

VIZ-05-003



MetaPost

VIZ-05-004



GMT

VIZ-05-005

VIZ-05-001

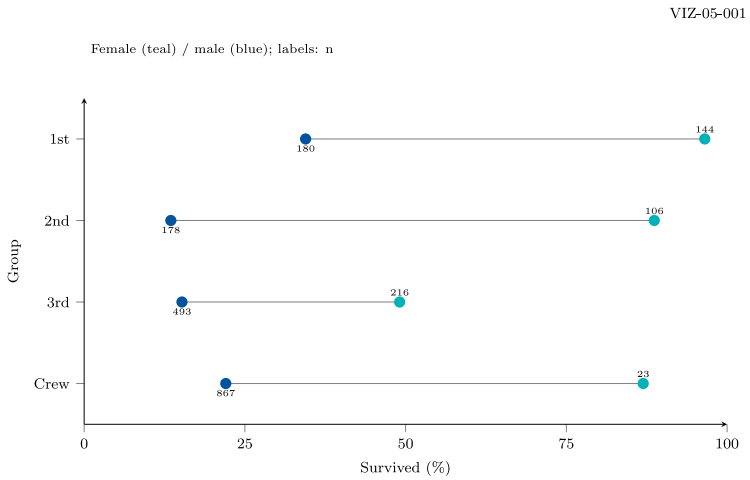
PGFplots / TikZ: dumbbell

Read each row and connect the two rates in axis coordinates; circles stay a constant physical size.

Drawing commands

```
\pgfplotstableread{data/classes.tsv}\Data
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0,
    xmax=100, ymin=0.5,
    ymax=4.5, xtick={0,25,50,75,100},
    ytick={1,2,3,4}, xlabel={Survived (\%)},
    ylabel={Group}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false, yticklabels={Crew,3rd,2nd,1st}
]
  \pgfplotsextra{
    \foreach \i in {0,...,3}{
      \pgfplotstablegetelem{\i}{[index]0}\of\Data\let\va\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]1}\of\Data\let\vb\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]2}\of\Data\let\vc\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]3}\of\Data\let\vd\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]4}\of\Data\let\ve\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]5}\of\Data\let\vf\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]6}\of\Data\let\vg\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]7}\of\Data\let\vh\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]8}\of\Data\let\vi\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]9}\of\Data\let\vj\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]10}\of\Data\let\vk\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]11}\of\Data\let\vl\pgfplotsretval
      \pgfmathsetmacro{\yy}{5-\va}
      \draw[gray] (axis cs:\vh,\yy)--(axis cs:\vk,\yy);
      \fill[Teal] (axis cs:\vh,\yy) circle[radius=3bp];
      \fill[Blue] (axis cs:\vk,\yy) circle[radius=3bp];
      \node[above,font=\tiny] at (axis cs:\vh,\yy) {\vf};
      \node[below,font=\tiny] at (axis cs:\vk,\yy) {\vi};
    }
  }
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-05-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`pgfplotstable + TikZ paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-05-002

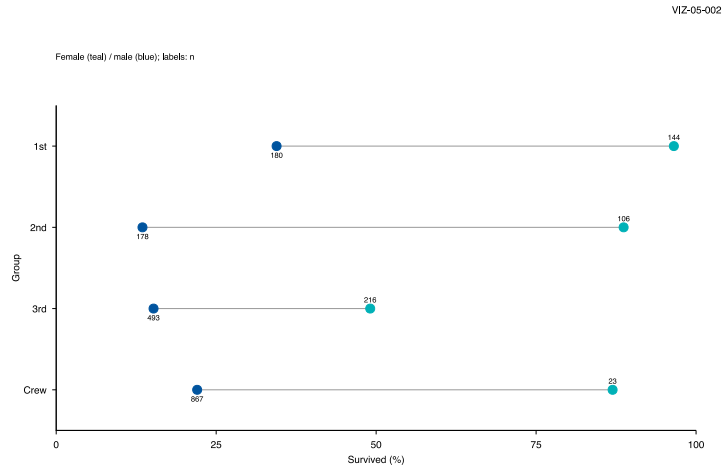
gnuplot: dumbbell

A horizontal vector joins each pair; separate point series retain the sex colours and denominator labels.

Drawing commands

```
plot "data/classes.tsv" using 11:(5 - $1):($8 - $11):(0) \
        with vectors nohead lc rgb "#999999", \
     "" using 8:(5 - $1) \
        with points pt 7 ps .8 lc rgb "#00b1b7", \
     "" using 11:(5 - $1) \
        with points pt 7 ps .8 lc rgb "#00549f", \
     "" using 8:(5 - $1):(sprintf("%d", $6)) \
        with labels offset 0, .9 font ",6", \
     "" using 11:(5 - $1):(sprintf("%d", $9)) \
        with labels offset 0, -.9 font ",6"
```

Actual gnuplot output



VIZ-05-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`vectors nohead + points`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-05-003

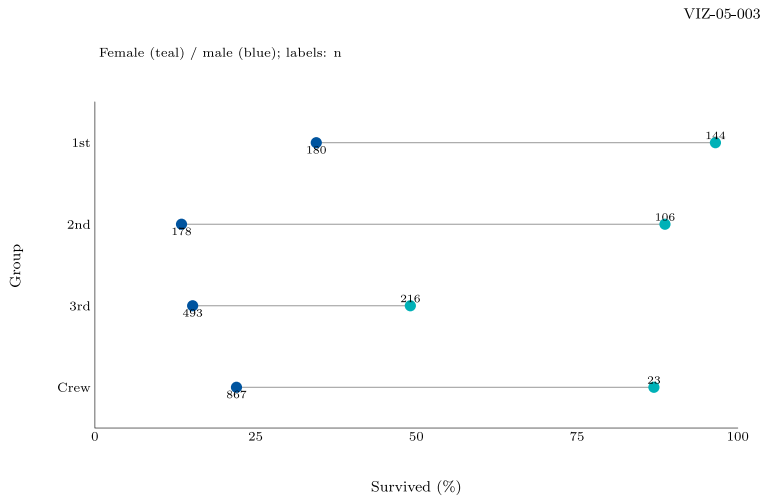
Asymptote: dumbbell

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
real[][] d = input("data/classes.tsv").line();
for (int i = 0; i < d.length; ++i) {
    real[] v = d[i];
    draw(P(v[7], 5 - v[0])--P(v[10], 5 - v[0]), gray(.6));
    fill(circle(P(v[7], 5 - v[0]), 3), Teal);
    fill(circle(P(v[10], 5 - v[0]), 3), Blue);
    label(string((int)v[5]), P(v[7], 5 - v[0]), N, fontsize(6));
    label(string((int)v[8]), P(v[10], 5 - v[0]), S, fontsize(6));
}
```

Actual Asymptote output



VIZ-05-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-05-004

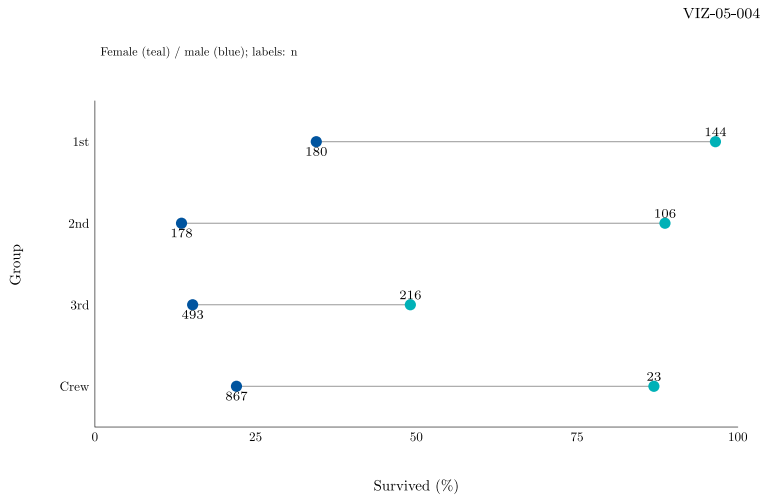
MetaPost: dumbbell

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/classes.tsv", c,
    n := n + 1;
    for j = 1 upto 12:
        v[n][j] := scantokens c[j];
    endfor
);
for k = 1 upto n:
    draw P(v[k][8], 5 - v[k][1])--P(v[k][11], 5 - v[k][1]) withcolor .6white;
    fill fullcircle scaled 6 shifted P(v[k][8], 5 - v[k][1]) withcolor Teal;
    fill fullcircle scaled 6 shifted P(v[k][11], 5 - v[k][1]) withcolor Blue;
    label.top(decimal v[k][6] infont "cmr7", P(v[k][8], 5 - v[k][1]));
    label.bot(decimal v[k][9] infont "cmr7", P(v[k][11], 5 - v[k][1]));
endfor
```

Actual MetaPost output



VIZ-05-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-05-005

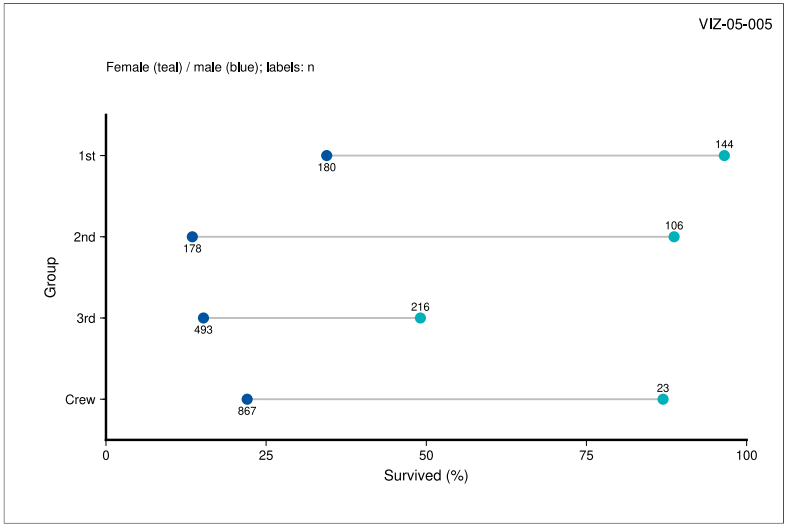
GMT: dumbbell

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
awk '{print ">";print $8,5-$1;print $11,5-$1}' data/classes.tsv | gmt plot -W1p,gray
awk '{print $8,5-$1}' data/classes.tsv | gmt plot -Sc6p -G#00b1b7
awk '{print $11,5-$1}' data/classes.tsv | gmt plot -Sc6p -G#00549f
awk '{print $8,5-$1,$6}' data/classes.tsv | gmt text -F+f6p+jBC -D0/4p
awk '{print $11,5-$1,$9}' data/classes.tsv | gmt text -F+f6p+jTC -D0/-4p
```

Actual GMT output



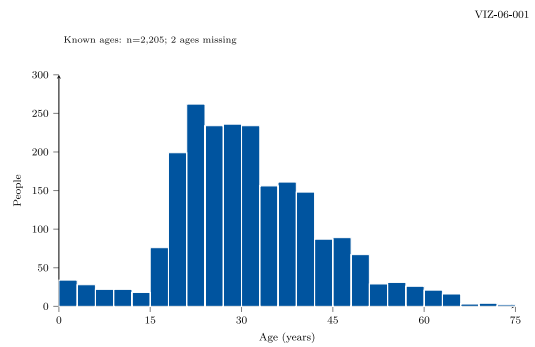
VIZ-05-005 · native vector output

GMT · exit 0

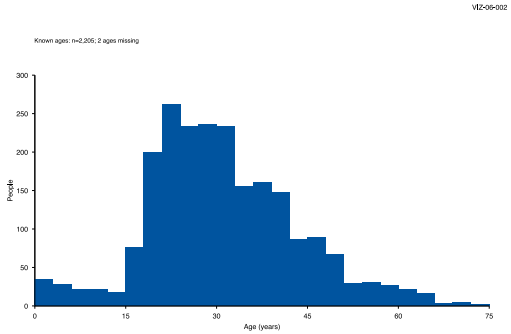
Command or choice	Meaning
`segments + -Sc symbols`	Native drawing method used here.
`classes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

Age distribution in three-year bins

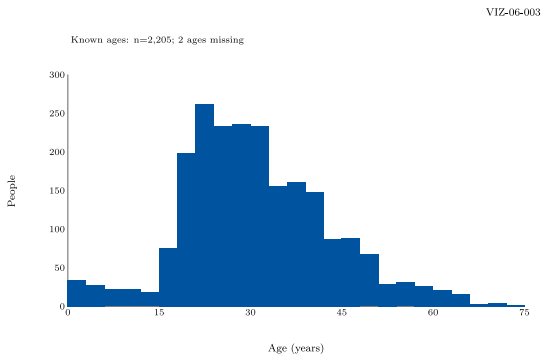
Known ages only: n=2,205. Bins are [0,3), [3,6), ... [72,75); fractional ages are not rounded.



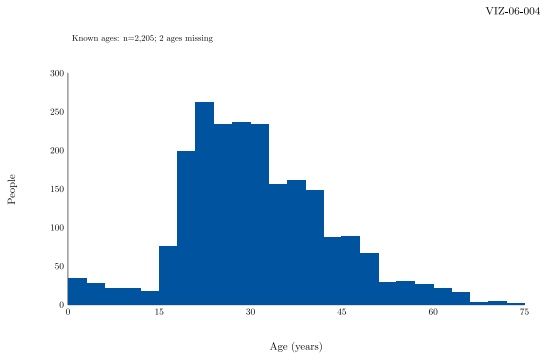
PGFplots / TikZ
VIZ-06-001



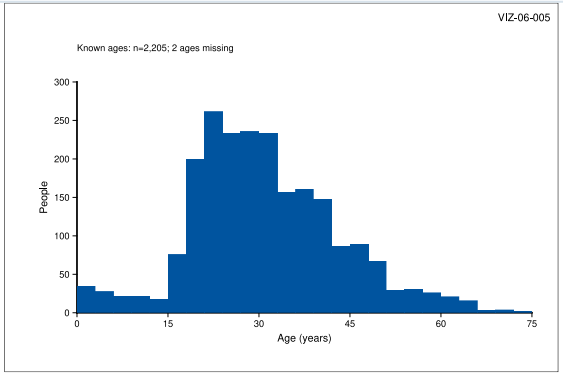
gnuplot
VIZ-06-002



Asymptote
VIZ-06-003



MetaPost
VIZ-06-004



GMT
VIZ-06-005

VIZ-06-001

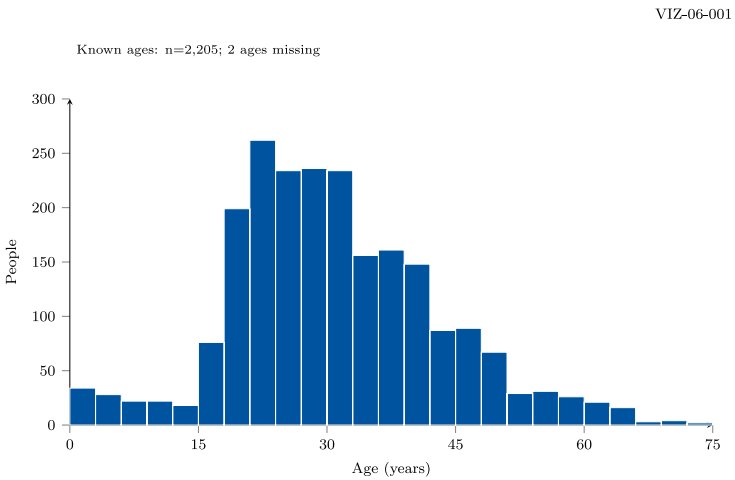
PGFplots / TikZ: histogram

The shared three-year bins become bars of width 13.8 bp on a 75-year axis.

Drawing commands

```
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0,
    xmax=75, ymin=0,
    ymax=300, xtick={0,15,30,45,60,75},
    ytick={0,50,100,150,200,250,300}, xlabel={Age (years)},
    ylabel={People}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false
]
  \addplot[ybar,bar shift=0pt,bar width=13.8bp,fill=Blue,draw=white,line width=.2bp]
  table[x index=0,y index=3]{data/ages.tsv};
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-06-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`table + fixed bar width`	Native drawing method used here.
`ages.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-06-002

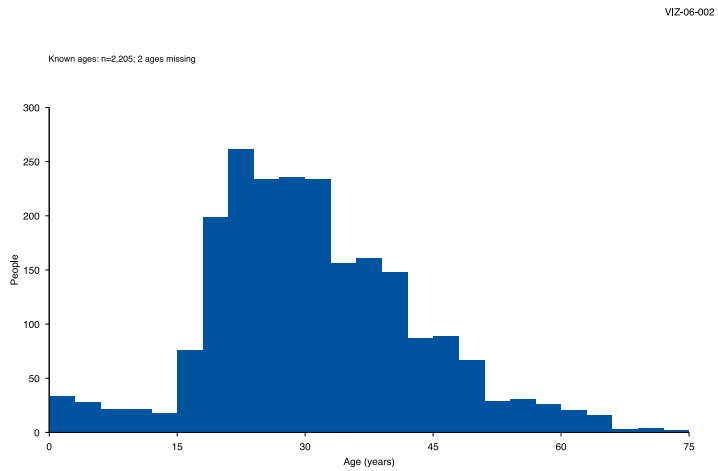
gnuplot: histogram

Draw pre-binned counts at the shared bin centres; no engine-specific histogram binning occurs.

Drawing commands

```
set boxwidth 3 absolute
plot "data/ages.tsv" using 1:4 with boxes lc rgb "#00549f"
```

Actual gnuplot output



VIZ-06-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`boxwidth 3 absolute`	Native drawing method used here.
`ages.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-06-003

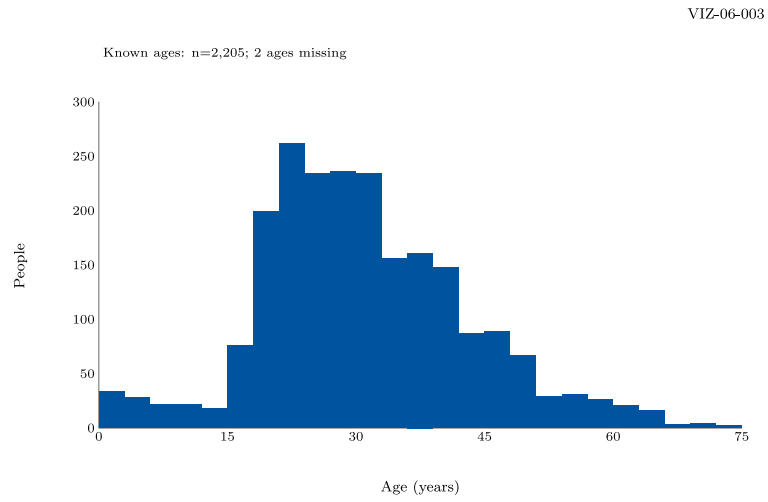
Asymptote: histogram

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
real[][] d = input("data/ages.tsv").line();
for (int i = 0; i < d.length; ++i) {
    real[] v = d[i];
    rect(v[1], 0, v[2], v[3], Blue);
}
```

Actual Asymptote output



VIZ-06-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`ages.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-06-004

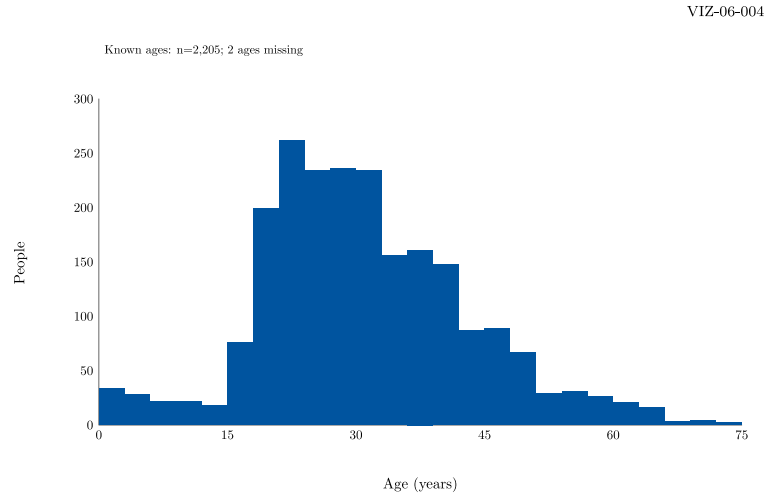
MetaPost: histogram

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/ages.tsv", c,
    n := n + 1;
    for j = 1 upto 10:
        v[n][j] := scantokens c[j];
    endfor
);
for k = 1 upto n:
    rect(v[k][2], 0, v[k][3], v[k][4], Blue);
endfor
```

Actual MetaPost output



VIZ-06-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`ages.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-06-005

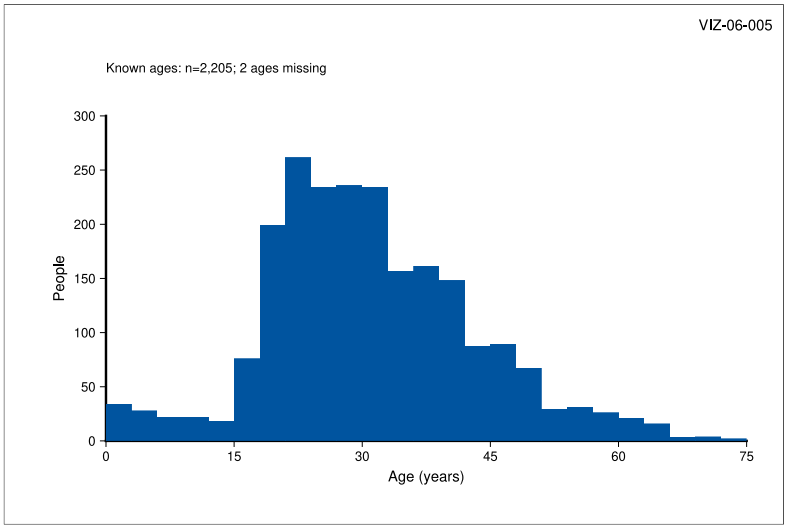
GMT: histogram

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
gmt plot data/ages.tsv -i0,3 -Sb13.8p+b0 -G#00549f
```

Actual GMT output



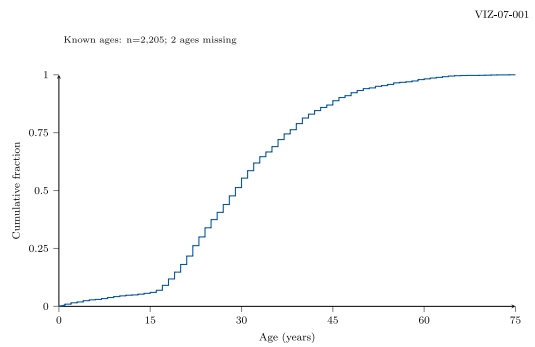
VIZ-06-005 · native vector output

GMT · exit 0

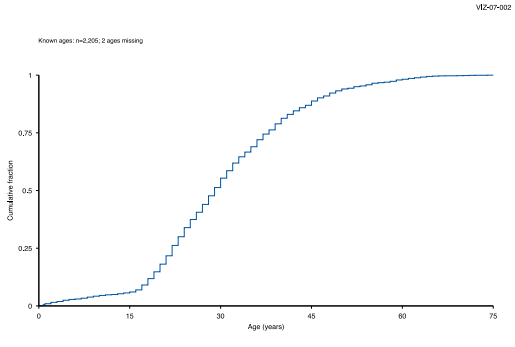
Command or choice	Meaning
`plot -Sb`	Native drawing method used here.
`ages.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

The empirical cumulative age distribution

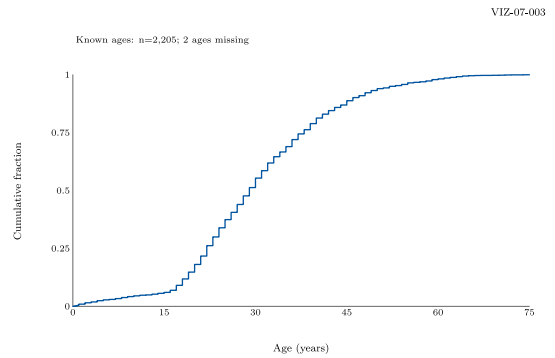
Right-continuous ECDF of all 2,205 known ages. Shared vertices group tied ages and make step conventions identical.



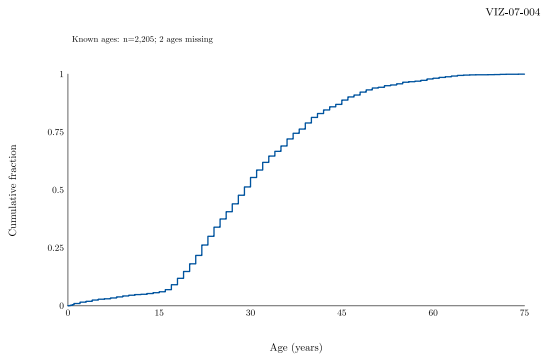
PGFplots / TikZ
VIZ-07-001



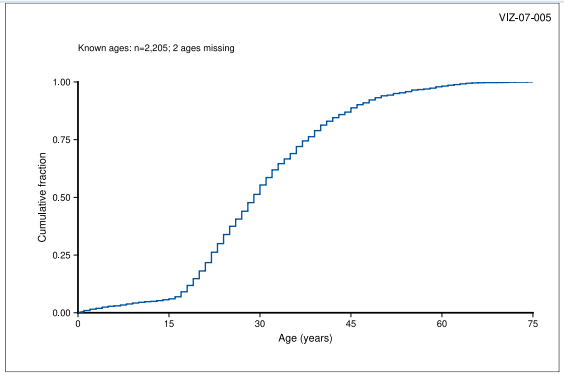
gnuplot
VIZ-07-002



Asymptote
VIZ-07-003



MetaPost
VIZ-07-004



GMT
VIZ-07-005

VIZ-07-001

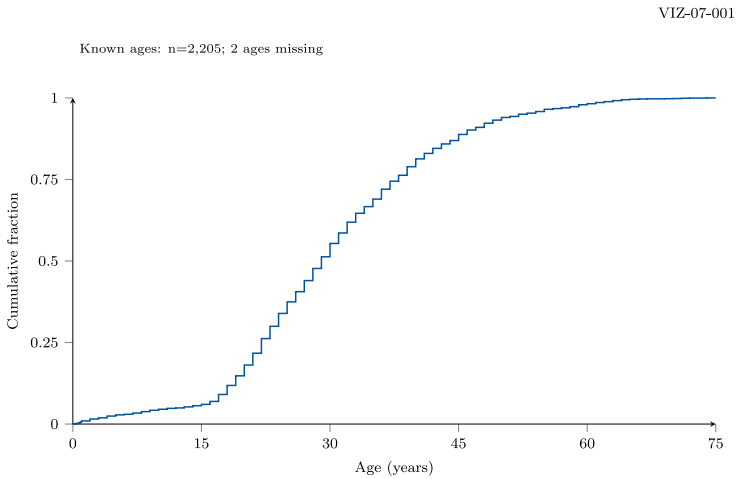
PGFplots / TikZ: ecdf

Plot the precomputed vertical-and-horizontal vertices directly, preserving ties and right continuity.

Drawing commands

```
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0,
    xmax=75, ymin=0,
    ymax=1, xtick={0,15,30,45,60,75},
    ytick={0,0.25,0.5,0.75,1}, xlabel={Age (years)},
    ylabel={Cumulative fraction}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false
]
  \addplot[Blue,thick,no marks]
  table[x index=0,y index=1]{data/ecdf.tsv};
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-07-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`table + line path`	Native drawing method used here.
`ecdf.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-07-002

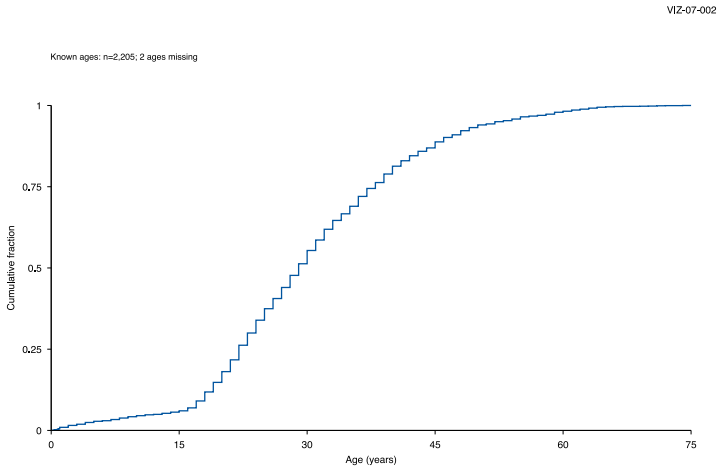
gnuplot: ecdf

The shared explicit step vertices make an ordinary line plot an exact empirical CDF.

Drawing commands

```
plot "data/ecdf.tsv" using 1:2 with lines lw 1.4 lc rgb "#00549f"
```

Actual gnuplot output



VIZ-07-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`with lines`	Native drawing method used here.
`ecdf.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-07-003

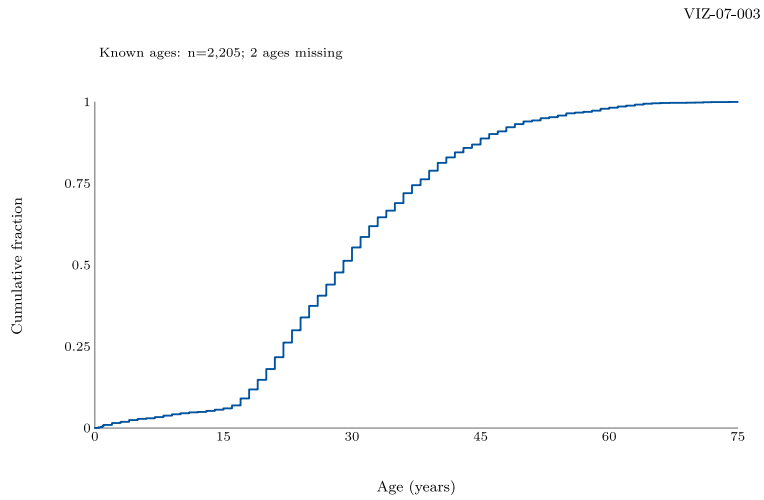
Asymptote: ecdf

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
real[][] d = input("data/ecdf.tsv").line();
path curve = P(d[0][0], d[0][1]);
for (int i = 1; i < d.length; ++i)
    curve = curve--P(d[i][0], d[i][1]);
draw(curve, Blue + linewidth(1));
```

Actual Asymptote output



VIZ-07-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`ecdf.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-07-004

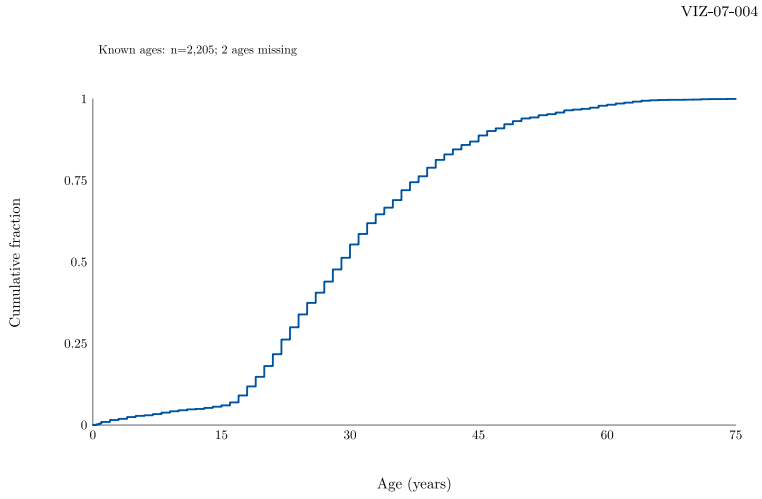
MetaPost: ecdf

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/ecdf.tsv", c,
    n := n + 1;
    for j = 1 upto 2:
        v[n][j] := scantokens c[j];
    endfor
);
path curve;
curve := P(v[1][1], v[1][2]);
for k = 2 upto n:
    curve := curve--P(v[k][1], v[k][2]);
endfor
draw curve withpen pencircle scaled 1 withcolor Blue;
```

Actual MetaPost output



VIZ-07-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`ecdf.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-07-005

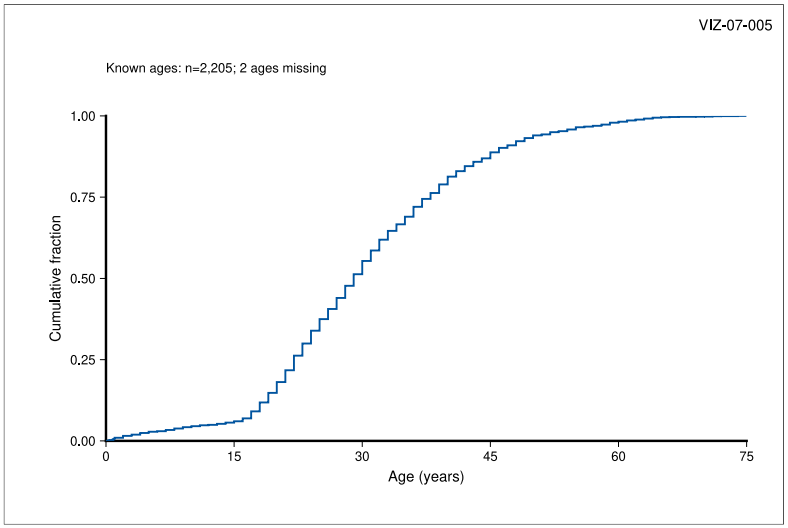
GMT: ecdf

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
gmt plot data/ecdf.tsv -i0,1 -W1p,#00549f
```

Actual GMT output



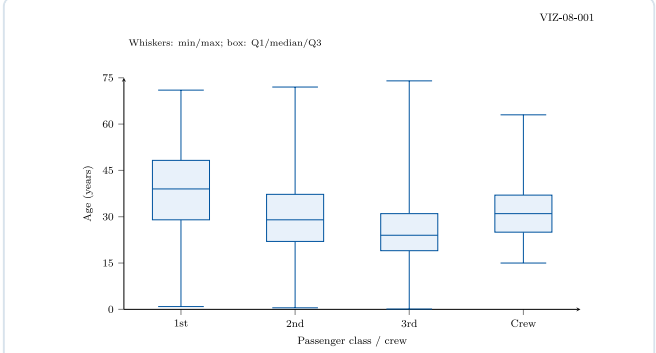
VIZ-07-005 · native vector output

GMT · exit 0

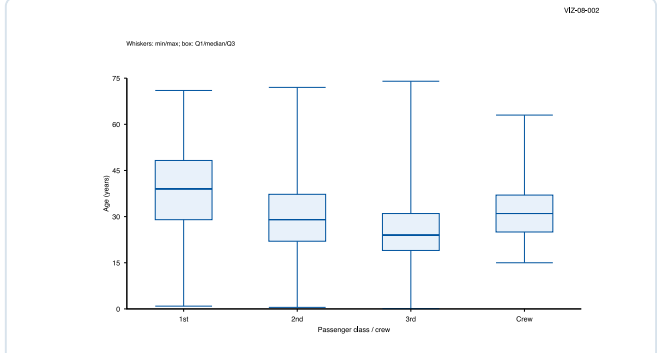
Command or choice	Meaning
`plot -W`	Native drawing method used here.
`ecdf.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

Five-number age summaries

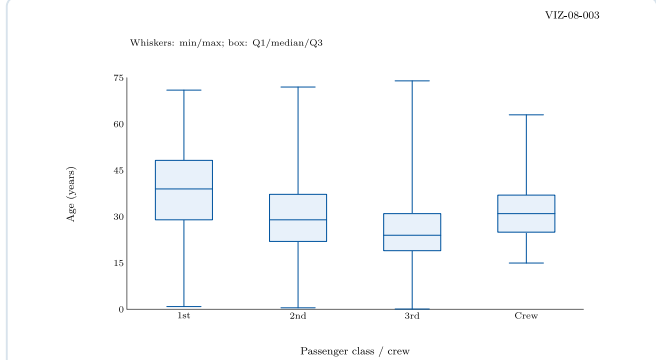
Whiskers are minimum and maximum. Quartiles use linear interpolation at p*(n-1); no automatic outlier rule is applied.



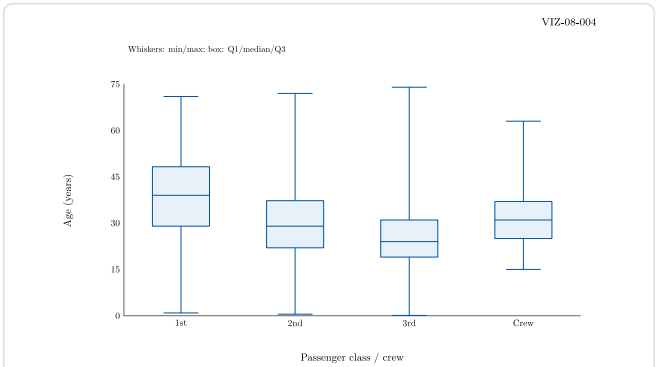
PGFplots / TikZ
VIZ-08-001



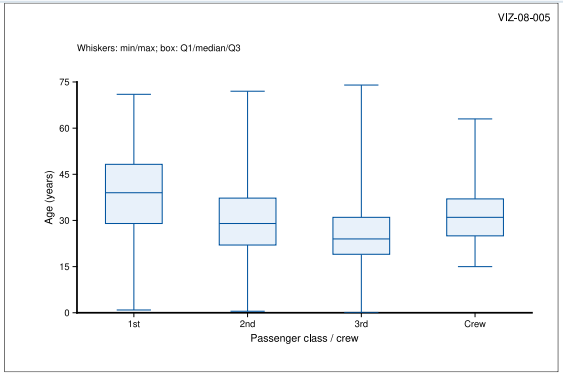
gnuplot
VIZ-08-002



Asymptote
VIZ-08-003



MetaPost
VIZ-08-004



GMT
VIZ-08-005

VIZ-08-001

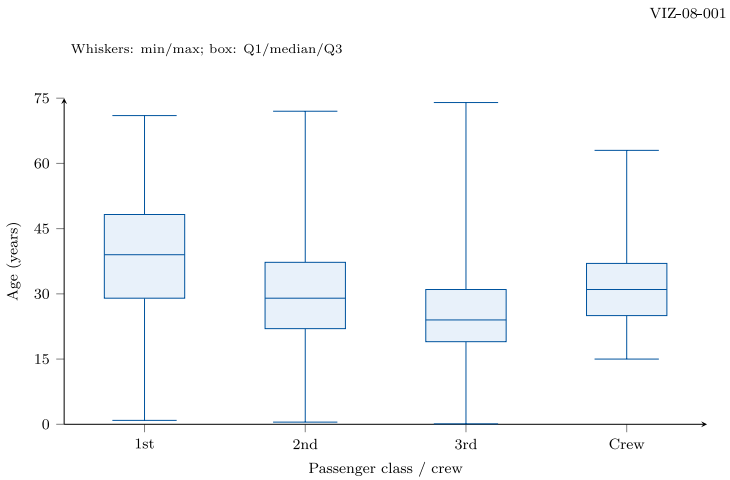
PGFplots / TikZ: box

PGFplots consumes shared minimum, quartiles, median and maximum without recalculating them.

Drawing commands

```
\pgfplotstableread{data/boxes.tsv}\Data
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0.5,
    xmax=4.5, ymin=0,
    ymax=75, xtick={1,2,3,4},
    ytick={0,15,30,45,60,75}, xlabel={Passenger class / crew},
    ylabel={Age (years)}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false, xticklabels={1st,2nd,3rd,Crew}
]
  \pgfplotsinvokeforeach{0,...,3}{\def\i{#1}
    \pgfplotstablegetelem{\i}{[index]0}\of\Data\let\va\pgfplotsretval
    \pgfplotstablegetelem{\i}{[index]1}\of\Data\let\vb\pgfplotsretval
    \pgfplotstablegetelem{\i}{[index]2}\of\Data\let\vc\pgfplotsretval
    \pgfplotstablegetelem{\i}{[index]3}\of\Data\let\vd\pgfplotsretval
    \pgfplotstablegetelem{\i}{[index]4}\of\Data\let\ve\pgfplotsretval
    \pgfplotstablegetelem{\i}{[index]5}\of\Data\let\vf\pgfplotsretval
    \pgfplotstablegetelem{\i}{[index]6}\of\Data\let\vg\pgfplotsretval
    \edef\boxcommand{\noexpand\addplot+[
      boxplot prepared={
        draw position=\va,
        lower whisker=\vb,
        lower quartile=\vc,
        median=\vd,
        upper quartile=\ve,
        upper whisker=\vf
      },
      boxplot/draw direction=y,
      boxplot/box extend=.5,
      fill=Wash,
      draw=Blue
    ]
    coordinates {};}
    \boxcommand
  }
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-08-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`boxplot prepared`	Native drawing method used here.
`boxes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-08-002

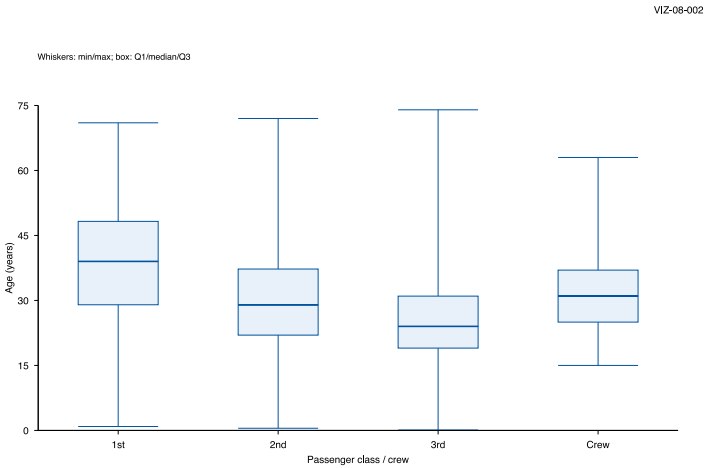
gnuplot: box

Map shared quartiles and extrema to candlestick geometry; a second layer draws the median.

Drawing commands

```
set boxwidth .5 absolute
set style fill solid 1 border lc rgb "#00549f"
plot "data/boxes.tsv" using 1:3:2:6:5 \
        with candlesticks whiskerbars .5 lw 1 lc rgb "#00549f" fc rgb "#e8f1fa", \
     "" using 1:4:4:4:4 \
        with candlesticks lw 1.4 lc rgb "#00549f"
```

Actual gnuplot output



VIZ-08-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`candlesticks + whiskerbars`	Native drawing method used here.
`boxes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-08-003

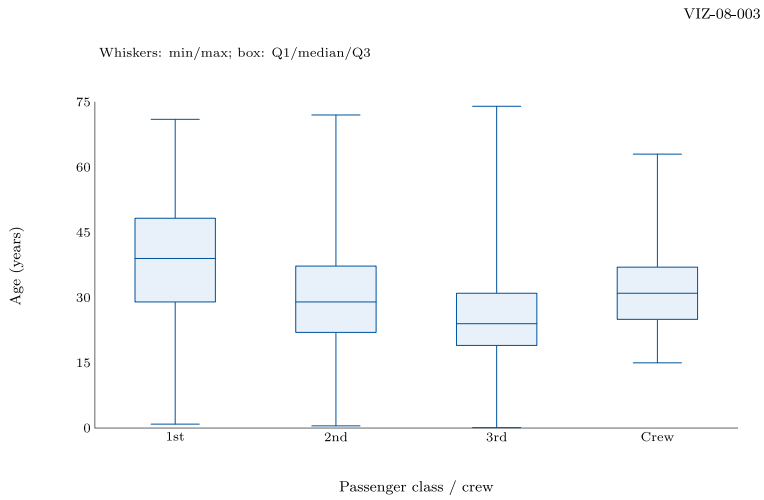
Asymptote: box

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
real[][] d = input("data/boxes.tsv").line();
for (int i = 0; i < d.length; ++i) {
    real[] v = d[i];
    draw(P(v[0], v[1])--P(v[0], v[5]), Blue);
    for (int j = 1; j <= 5; j += 4)
        draw(P(v[0] - .15, v[j])--P(v[0] + .15, v[j]), Blue);
    rect(v[0] - .25, v[2], v[0] + .25, v[4], Wash);
    draw(P(v[0] - .25, v[2])--P(v[0] + .25, v[2])--P(v[0] + .25, v[4])--P(v[0] - .25,
        v[4])--cycle, Blue);
    draw(P(v[0] - .25, v[3])--P(v[0] + .25, v[3]), Blue);
}
```

Actual Asymptote output



VIZ-08-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`boxes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-08-004

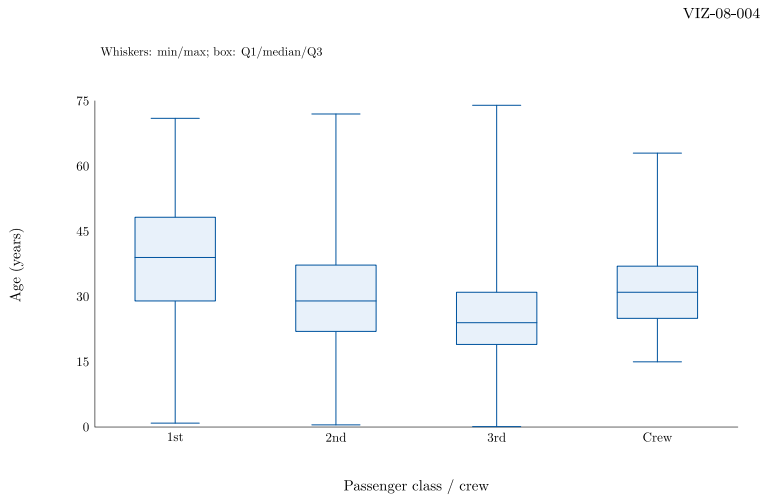
MetaPost: box

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/boxes.tsv", c,
    n := n + 1;
    for j = 1 upto 7:
        v[n][j] := scantokens c[j];
    endfor
);
for k = 1 upto n:
    draw P(v[k][1], v[k][2])--P(v[k][1], v[k][6]) withcolor Blue;
    for j = 2 step 4 until 6:
        draw P(v[k][1] - .15, v[k][j])--P(v[k][1] + .15, v[k][j]) withcolor Blue;
    endfor
    rect(v[k][1] - .25, v[k][3], v[k][1] + .25, v[k][5], Wash);
    draw P(v[k][1] - .25, v[k][3])--P(v[k][1] + .25, v[k][3])--P(v[k][1] + .25,
        v[k][5])--P(v[k][1] - .25, v[k][5])--cycle withcolor Blue;
    draw P(v[k][1] - .25, v[k][4])--P(v[k][1] + .25, v[k][4]) withcolor Blue;
endfor
```

Actual MetaPost output



VIZ-08-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`boxes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-08-005

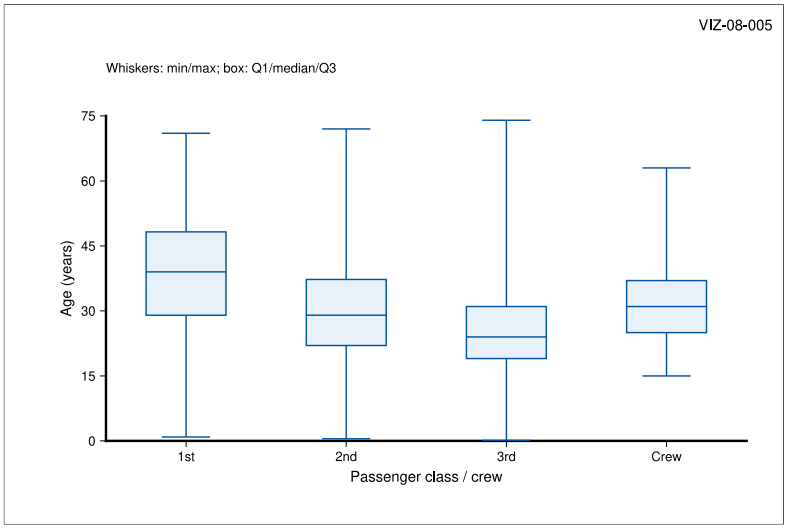
GMT: box

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
gmt plot data/boxes.tsv -i0,3,1,2,4,5 -EY+w43p/26p+p0.8p,#00549f -G#e8f1fa
-W1p,#00549f
```

Actual GMT output



VIZ-08-005 · native vector output

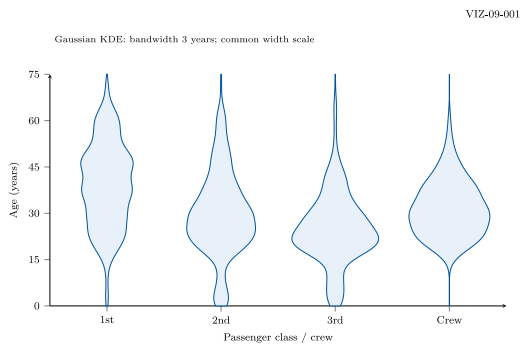
GMT · exit 0

Command or choice	Meaning
`plot -EY`	Native drawing method used here.
`boxes.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

Violin densities with a shared bandwidth

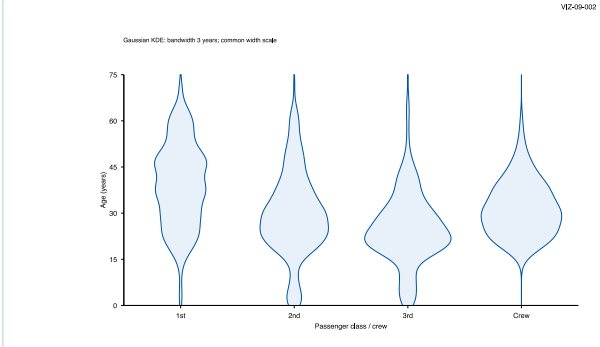
Gaussian KDE, bandwidth 3 years, equal area per group and one common width factor. Curves are displayed over ages 0–75.

The Gaussian kernels integrate to one per group before display clipping. The display is limited to 0–75 years without boundary correction or renormalization; the small tail beyond this range is omitted. Width is not scaled by group size.



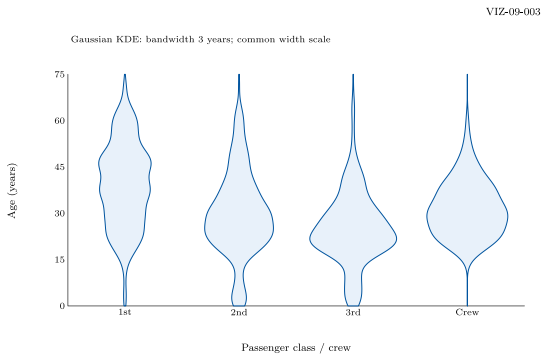
PGFplots / TikZ

VIZ-09-001



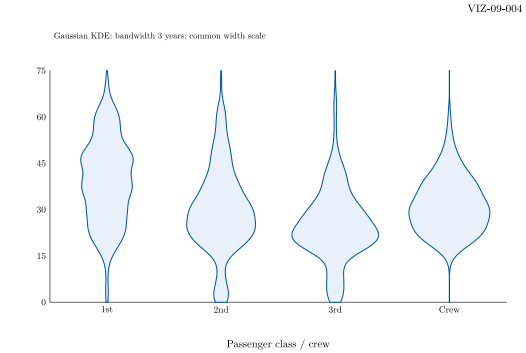
gnuplot

VIZ-09-002



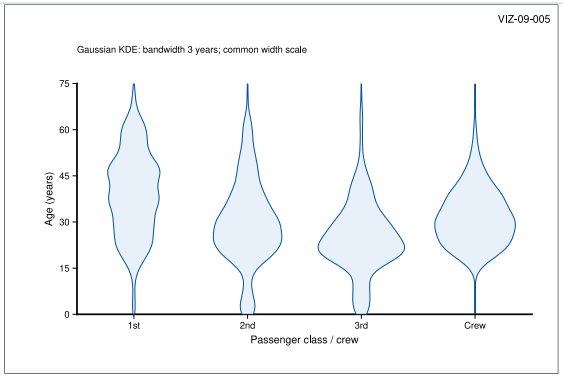
Asymptote

VIZ-09-003



MetaPost

VIZ-09-004



GMT

VIZ-09-005

VIZ-09-001

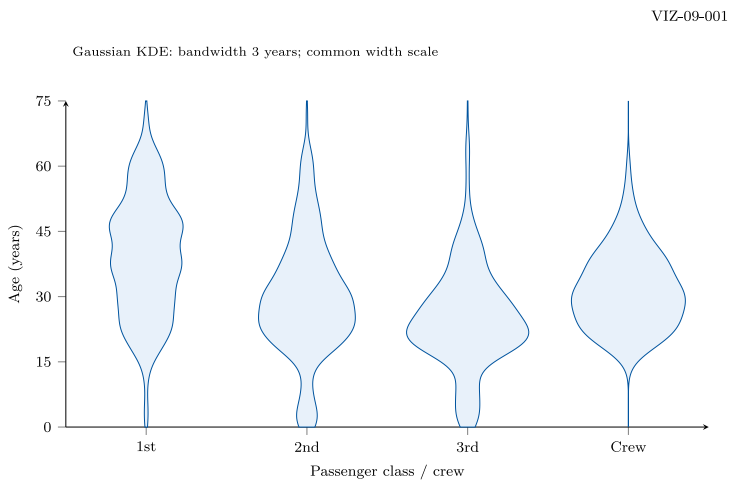
PGFplots / TikZ: violin

Four shared KDE polygons become closed filled paths; PGFplots handles only axes and geometry.

Drawing commands

```
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0.5,
    xmax=4.5, ymin=0,
    ymax=75, xtick={1,2,3,4},
    ytick={0,15,30,45,60,75}, xlabel={Passenger class / crew},
    ylabel={Age (years)}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false, xticklabels={1st,2nd,3rd,Crew}
]
  \addplot[fill=Wash,draw=Blue,thin]
  table[x index=0,y index=1]{data/violin-1.tsv} \closedcycle;
  \addplot[fill=Wash,draw=Blue,thin]
  table[x index=0,y index=1]{data/violin-2.tsv} \closedcycle;
  \addplot[fill=Wash,draw=Blue,thin]
  table[x index=0,y index=1]{data/violin-3.tsv} \closedcycle;
  \addplot[fill=Wash,draw=Blue,thin]
  table[x index=0,y index=1]{data/violin-4.tsv} \closedcycle;
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-09-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`closedcycle`	Native drawing method used here.
`violin-1.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-09-002

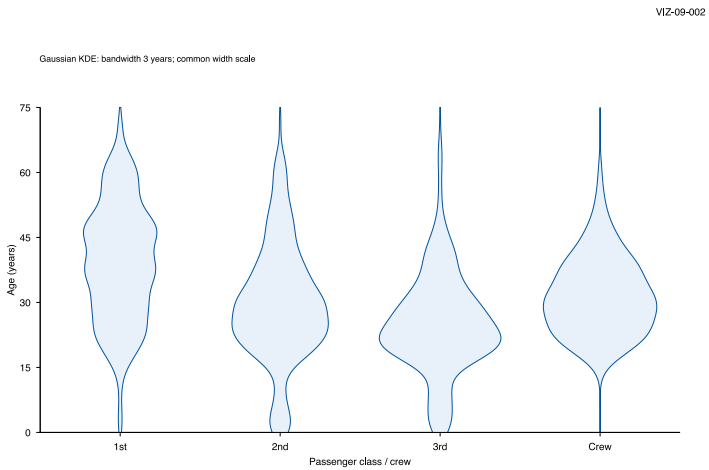
gnuplot: violin

Read four prepared polygon boundaries and fill their closed interiors.

Drawing commands

```
plot "data/violin-1.tsv" using 1:2 \
        with filledcurves closed fc rgb "#e8f1fa" lc rgb "#00549f", \
     "data/violin-2.tsv" using 1:2 \
        with filledcurves closed fc rgb "#e8f1fa" lc rgb "#00549f", \
     "data/violin-3.tsv" using 1:2 \
        with filledcurves closed fc rgb "#e8f1fa" lc rgb "#00549f", \
     "data/violin-4.tsv" using 1:2 \
        with filledcurves closed fc rgb "#e8f1fa" lc rgb "#00549f", \
     "data/violin-1.tsv" using 1:2 \
        with lines lc rgb "#00549f", \
     "data/violin-2.tsv" using 1:2 \
        with lines lc rgb "#00549f", \
     "data/violin-3.tsv" using 1:2 \
        with lines lc rgb "#00549f", \
     "data/violin-4.tsv" using 1:2 \
        with lines lc rgb "#00549f"
```

Actual gnuplot output



VIZ-09-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`filledcurves closed`	Native drawing method used here.
`violin-1.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-09-003

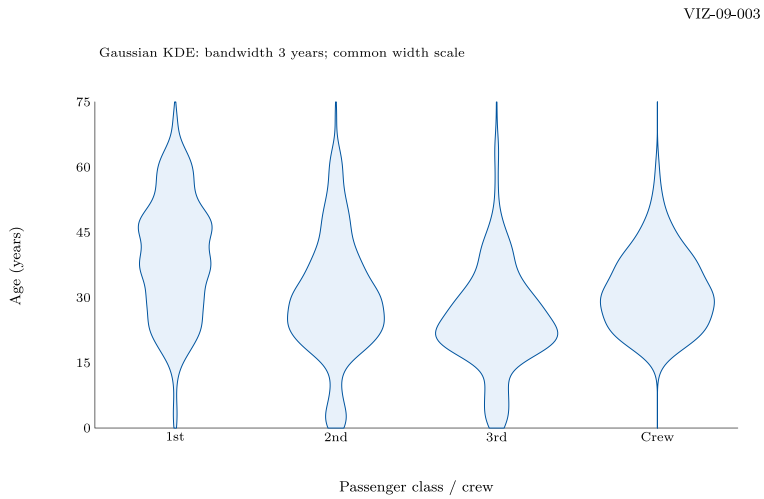
Asymptote: violin

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
for (int j = 1; j <= 4; ++j) {
    real[][] v = input("data/violin-"+string(j)+".tsv").line();
    path curve = P(v[0][0], v[0][1]);
    for (int i = 1; i < v.length; ++i)
        curve = curve--P(v[i][0], v[i][1]);
    filldraw(curve--cycle, Wash, Blue);
}
```

Actual Asymptote output



VIZ-09-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`violin-1.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-09-004

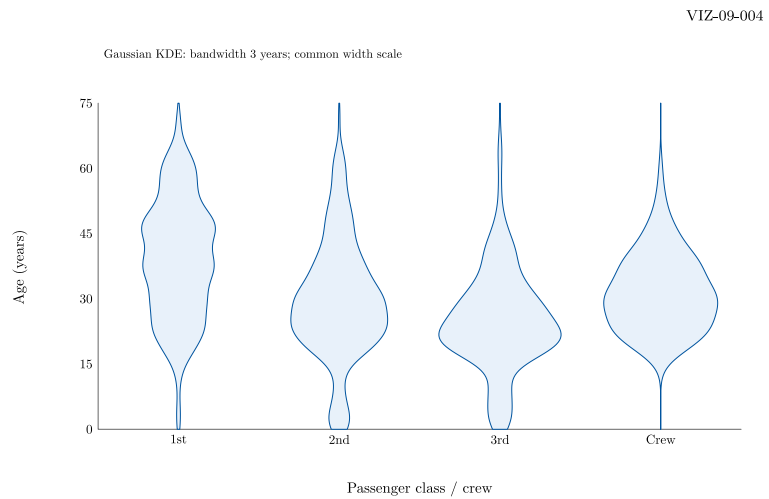
MetaPost: violin

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
path curve;
gdata("data/violin-1.tsv", c,
    if i = 1:
        curve := P(scantokens c1, scantokens c2);
    else:
        curve := curve--P(scantokens c1, scantokens c2);
    fi
);
fill curve--cycle withcolor Wash;
draw curve--cycle withcolor Blue;
gdata("data/violin-2.tsv", c,
    if i = 1:
        curve := P(scantokens c1, scantokens c2);
    else:
        curve := curve--P(scantokens c1, scantokens c2);
    fi
);
fill curve--cycle withcolor Wash;
draw curve--cycle withcolor Blue;
gdata("data/violin-3.tsv", c,
    if i = 1:
        curve := P(scantokens c1, scantokens c2);
    else:
        curve := curve--P(scantokens c1, scantokens c2);
    fi
);
fill curve--cycle withcolor Wash;
draw curve--cycle withcolor Blue;
gdata("data/violin-4.tsv", c,
    if i = 1:
        curve := P(scantokens c1, scantokens c2);
    else:
        curve := curve--P(scantokens c1, scantokens c2);
    fi
);
fill curve--cycle withcolor Wash;
draw curve--cycle withcolor Blue;
```

Actual MetaPost output



VIZ-09-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`violin-1.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-09-005

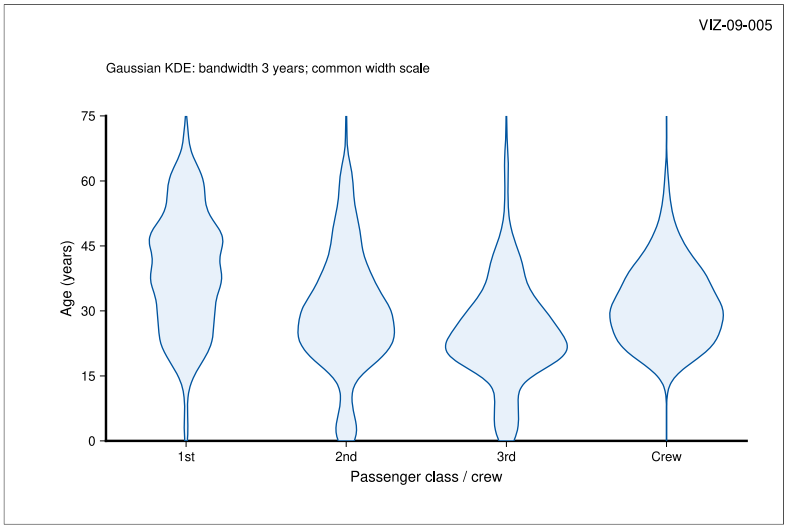
GMT: violin

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
for group in 1 2 3 4; do
  gmt plot "data/violin-$group.tsv" -L -G#e8f1fa -W.7p,#00549f
done
```

Actual GMT output



VIZ-09-005 · native vector output

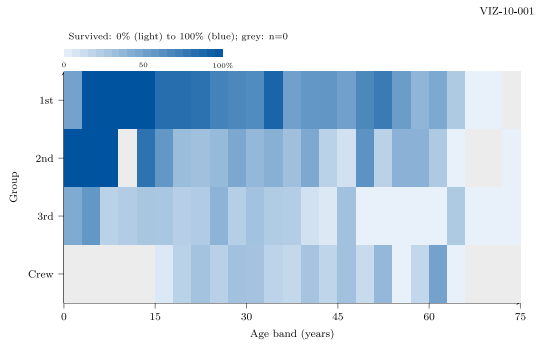
GMT · exit 0

Command or choice	Meaning
`plot -L`	Native drawing method used here.
`violin-1.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

Survival across age bands and groups

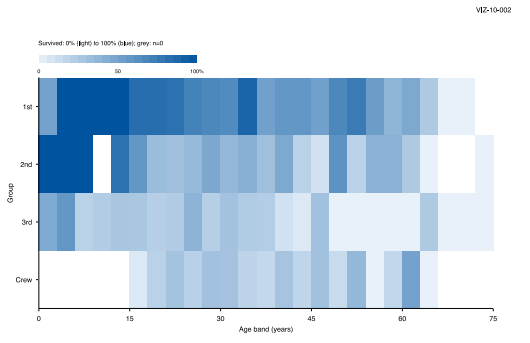
Cells use identical three-year bands and group denominators. Twelve n=0 cells are grey, not zero-percent survival.

Use this together with sample sizes: an extreme percentage in a sparse age band is less stable than the same percentage among many people. The blue endpoint is always 100 percent and the light endpoint is always zero.



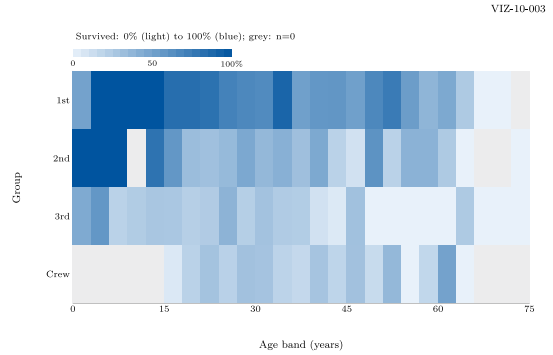
PGFplots / TikZ

VIZ-10-001



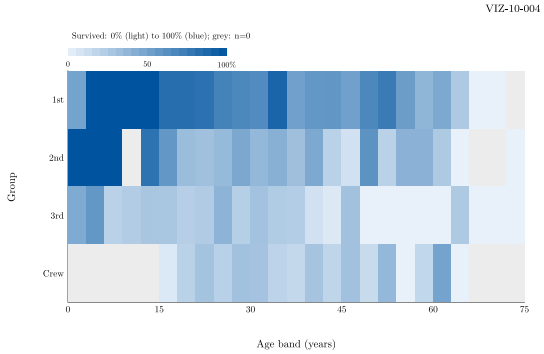
gnuplot

VIZ-10-002



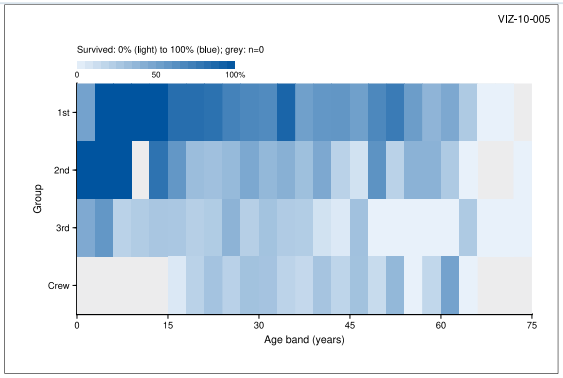
Asymptote

VIZ-10-003



MetaPost

VIZ-10-004



GMT

VIZ-10-005

VIZ-10-001

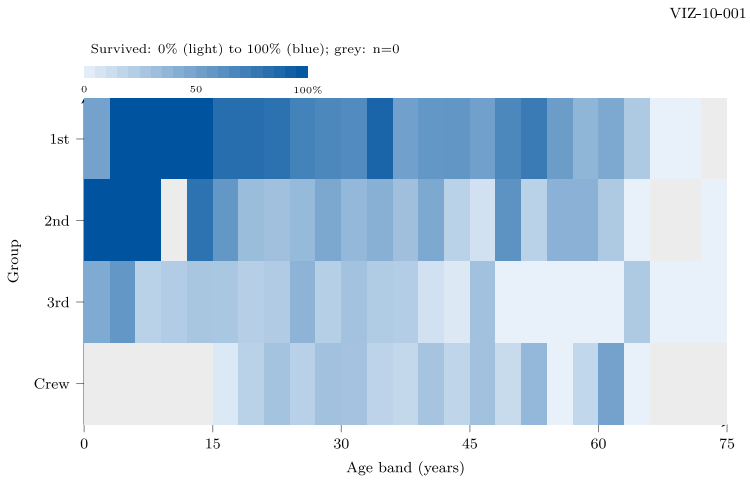
PGFplots / TikZ: heatmap

TikZ fills each cell using a continuous light-to-blue scale; empty cells get a separate grey fill.

Drawing commands

```
\pgfplotstableread{data/cells.tsv}\Data
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0,
    xmax=75, ymin=0.5,
    ymax=4.5, xtick={0,15,30,45,60,75},
    ytick={1,2,3,4}, xlabel={Age band (years)},
    ylabel={Group}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false, yticklabels={Crew,3rd,2nd,1st}
]
  \pgfplotsextra{
    \foreach \i in {0,...,99}{
      \pgfplotstablegetelem{\i}{[index]0}\of\Data\let\va\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]1}\of\Data\let\vb\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]2}\of\Data\let\vc\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]3}\of\Data\let\vd\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]4}\of\Data\let\ve\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]5}\of\Data\let\vf\pgfplotsretval
      \pgfmathsetmacro{\xl}{\va-1.5}
      \pgfmathsetmacro{\xr}{\va+1.5}
      \pgfmathsetmacro{\yl}{\vb-.5}
      \pgfmathsetmacro{\yr}{\vb+.5}
      \ifdim\vc pt<0pt
        \def\shade{Missing}
      \else
        \edef\shade{Blue!\vc!Wash}
      \fi
      \path[fill=\shade] (axis cs:\xl,\yl) rectangle (axis cs:\xr,\yr);
    }
  }
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-10-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`axis cs + colour mixing`	Native drawing method used here.
`cells.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-10-002

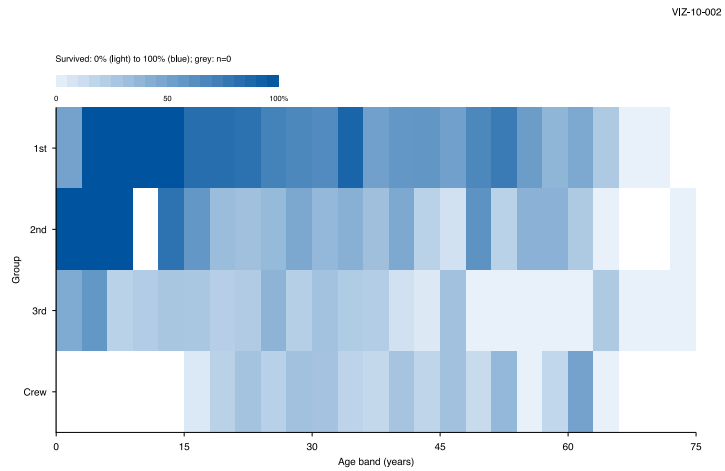
gnuplot: heatmap

Explicit cell limits prevent interpolation between bins; a grey background preserves empty cells.

Drawing commands

```
set object 1 rect from 0, .5 to 75, 4.5 behind fc rgb "#ececec" fs solid 1.0 noborder
plot "data/cells.tsv" using 1:2:($1 - 1.5):($1 + 1.5):($2 - .5):($2 + .5):($3 < 0 ? 1
\
    / 0 : $3) \
        with boxxyerrorbars lc palette
```

Actual gnuplot output



VIZ-10-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`boxxyerrorbars + palette`	Native drawing method used here.
`cells.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-10-003

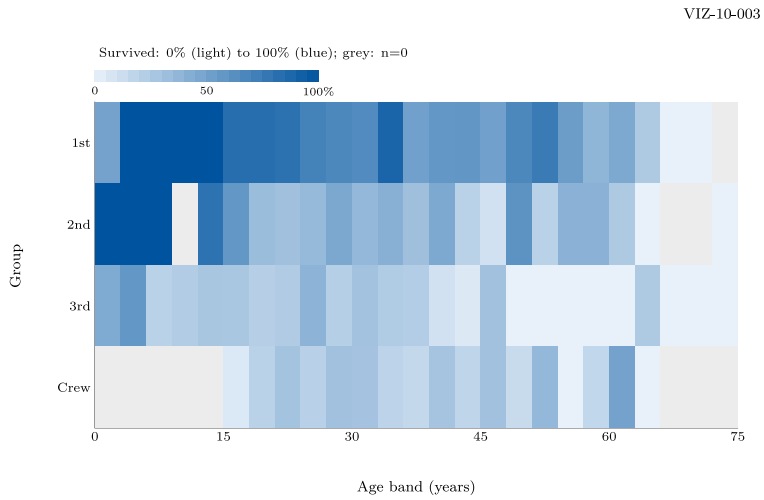
Asymptote: heatmap

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
real[][] d = input("data/cells.tsv").line();
for (int i = 0; i < d.length; ++i) {
    real[] v = d[i];
    pen shade = v[3] == 0 ? Missing : (1 - v[2] / 100) * Wash + (v[2] / 100) * Blue;
    rect(v[0] - 1.5, v[1] - .5, v[0] + 1.5, v[1] + .5, shade);
}
```

Actual Asymptote output



VIZ-10-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`cells.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-10-004

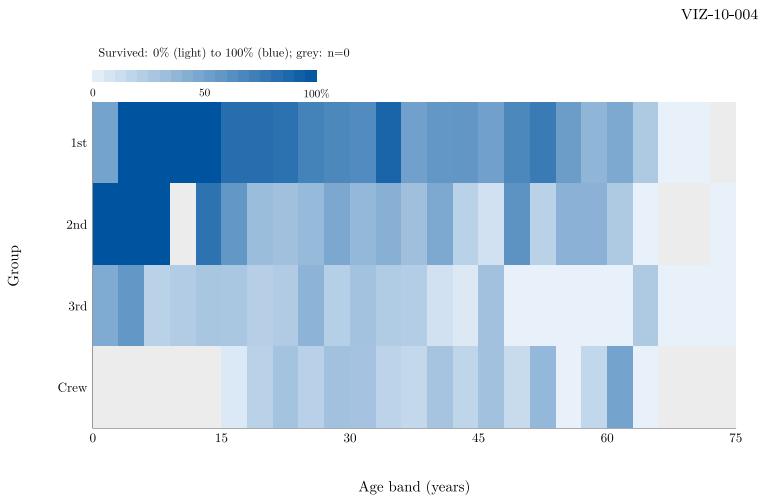
MetaPost: heatmap

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/cells.tsv", c,
    n := n + 1;
    for j = 1 upto 6:
        v[n][j] := scantokens c[j];
    endfor
);
for k = 1 upto n:
    rect(v[k][1] - 1.5, v[k][2] - .5, v[k][1] + 1.5, v[k][2] + .5,
    if v[k][4] = 0:
        Missing
    else:
        (v[k][3] / 100)[Wash, Blue]
    fi
    );
endfor
```

Actual MetaPost output



VIZ-10-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`cells.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-10-005

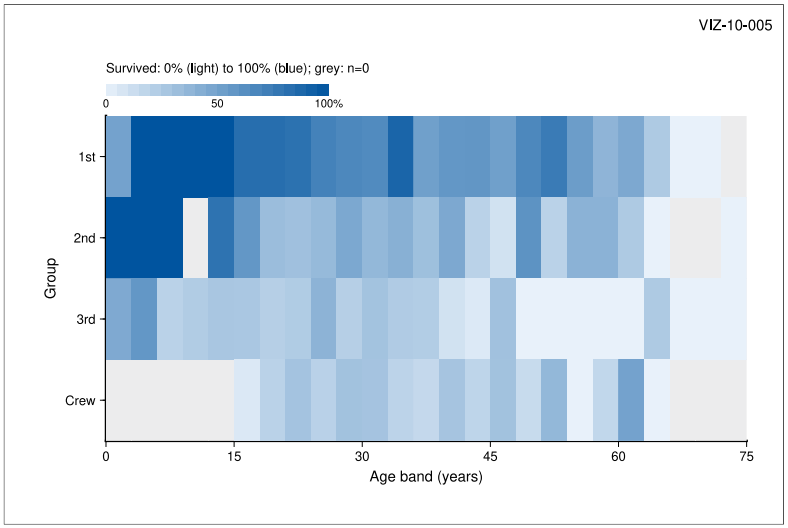
GMT: heatmap

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
gmt plot data/cells.tsv -i0,1 -Sr13.8p/43.75p -G#ececed
awk '$4>0 {print $1,$2,$3}' data/cells.tsv |
  gmt plot -Sr13.8p/43.75p -Cdata/survival.cpt
```

Actual GMT output



VIZ-10-005 · native vector output

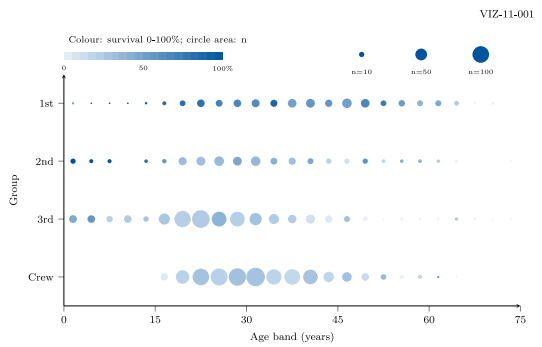
GMT · exit 0

Command or choice	Meaning
`plot -Sr + CPT`	Native drawing method used here.
`cells.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

Add sample size to the survival grid

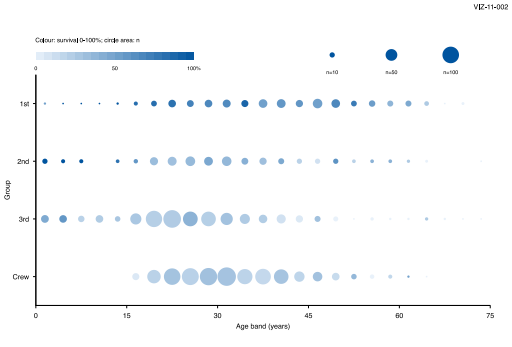
Colour shows survival percentage; circle area is proportional to n. Empty cells are omitted; diameter is 14*sqrt(n/max_n) points.

Use this together with sample sizes: an extreme percentage in a sparse age band is less stable than the same percentage among many people. The blue endpoint is always 100 percent and the light endpoint is always zero.



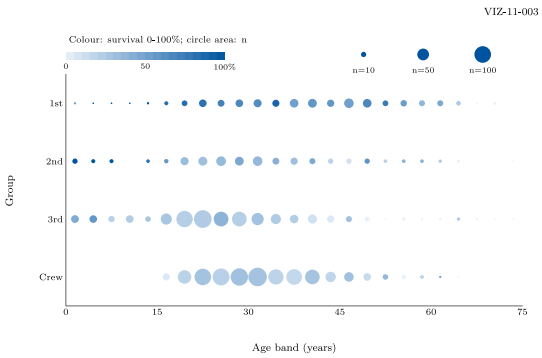
PGFplots / TikZ

VIZ-11-001



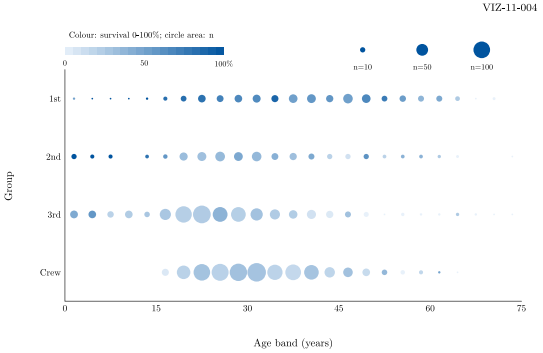
gnuplot

VIZ-11-002



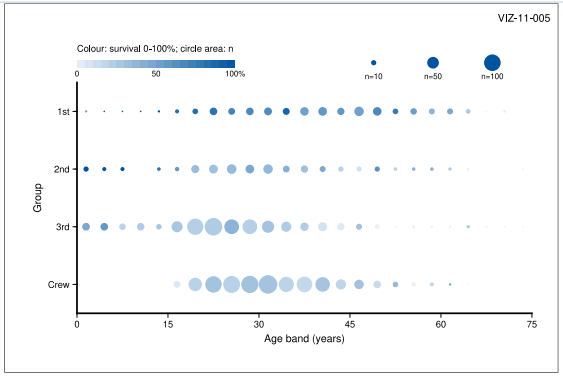
Asymptote

VIZ-11-003



MetaPost

VIZ-11-004



GMT

VIZ-11-005

VIZ-11-001

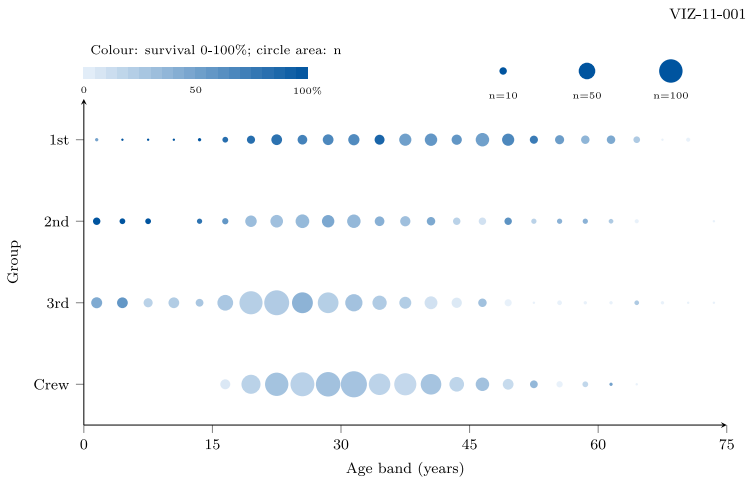
PGFplots / TikZ: bubble

Read shared diameters, halve them for TikZ radii, and mix colour from survival percentage.

Drawing commands

```
\pgfplotstableread{data/cells.tsv}\Data
\begin{axis}[
    width=345bp, height=175bp,
    scale only axis, at={(55bp,45bp)},
    anchor=south west, xmin=0,
    xmax=75, ymin=0.5,
    ymax=4.5, xtick={0,15,30,45,60,75},
    ytick={1,2,3,4}, xlabel={Age band (years)},
    ylabel={Group}, axis lines=left,
    tick align=outside, enlargelimits=false,
    clip=false, yticklabels={Crew,3rd,2nd,1st}
]
  \pgfplotsextra{
    \foreach \i in {0,...,99}{
      \pgfplotstablegetelem{\i}{[index]0}\of\Data\let\va\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]1}\of\Data\let\vb\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]2}\of\Data\let\vc\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]3}\of\Data\let\vd\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]4}\of\Data\let\ve\pgfplotsretval
      \pgfplotstablegetelem{\i}{[index]5}\of\Data\let\vf\pgfplotsretval
      \ifdim\vd pt>0pt
        \pgfmathsetmacro{\rr}{\vf/2}
        \fill[Blue!\vc!Wash] (axis cs:\va,\vb) circle[radius=\rr bp];
      \fi
    }
  }
\end{axis}
```

Actual PGFplots / TikZ output



VIZ-11-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`circle radius in bp`	Native drawing method used here.
`cells.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-11-002

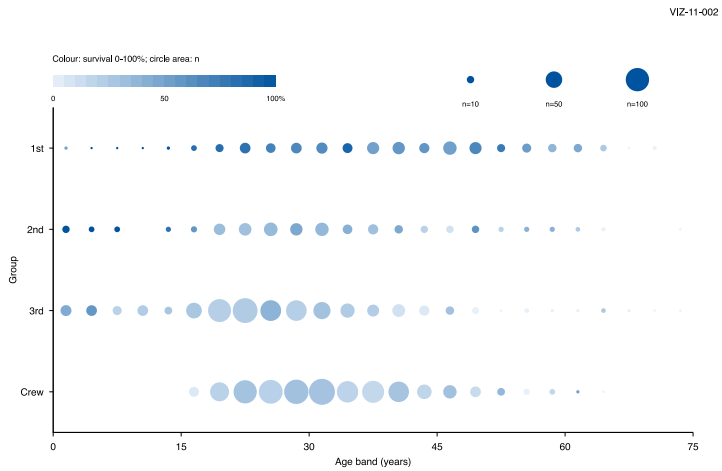
gnuplot: bubble

Convert shared physical diameters to x-axis radii; circle area remains proportional to cell count.

Drawing commands

```
plot "data/cells.tsv" using 1:2:($6 / 2 * 75 / 345):($4 == 0 ? 1 / 0 : $3) \
       with circles lc palette
```

Actual gnuplot output



VIZ-11-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`with circles + palette`	Native drawing method used here.
`cells.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-11-003

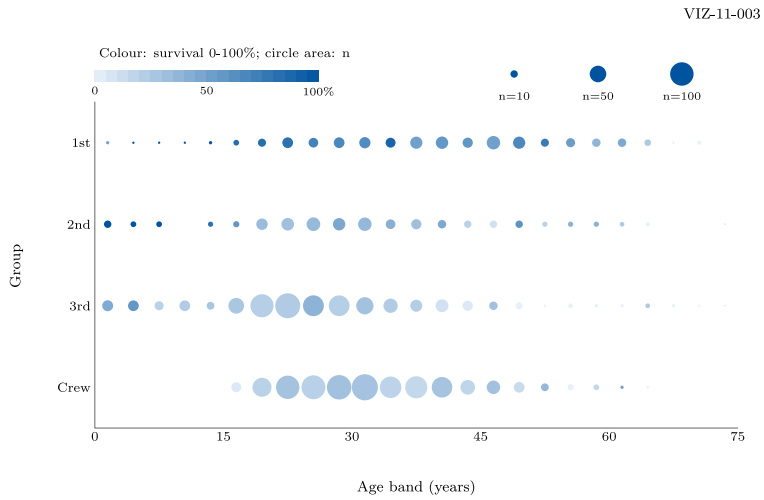
Asymptote: bubble

Asymptote reads the shared numeric table into typed arrays and draws this chart with paths, pens and physical-size symbols.

Drawing commands

```
real[][] d = input("data/cells.tsv").line();
for (int i = 0; i < d.length; ++i) {
    real[] v = d[i];
    if (v[3] > 0) fill(circle(P(v[0], v[1]), v[5] / 2),
        (1 - v[2] / 100) * Wash + (v[2] / 100) * Blue);
}
```

Actual Asymptote output



VIZ-11-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`cells.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-11-004

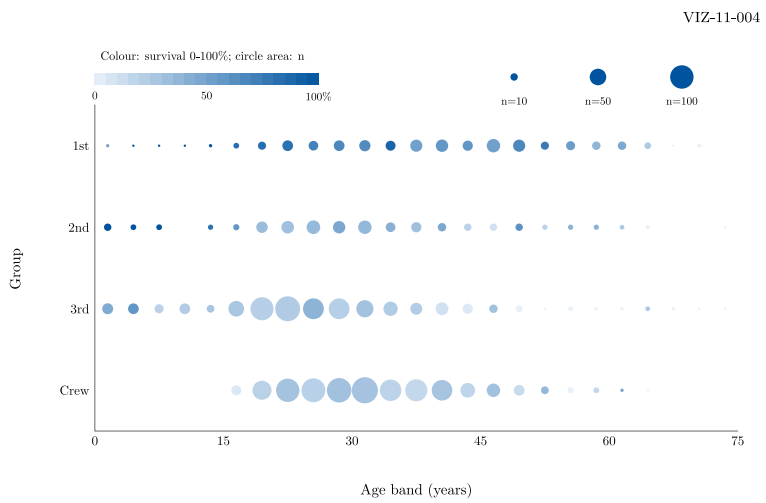
MetaPost: bubble

MetaPost reads numeric fields with gdata and scantokens, then constructs the chart with paths, TeX labels and colour interpolation.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/cells.tsv", c,
    n := n + 1;
    for j = 1 upto 6:
        v[n][j] := scantokens c[j];
    endfor
);
for k = 1 upto n:
    if v[k][4] > 0:
        fill fullcircle scaled v[k][6] shifted P(v[k][1], v[k][2])
            withcolor (v[k][3] / 100)[Wash, Blue];
    fi
endfor
```

Actual MetaPost output



VIZ-11-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`cells.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-11-005

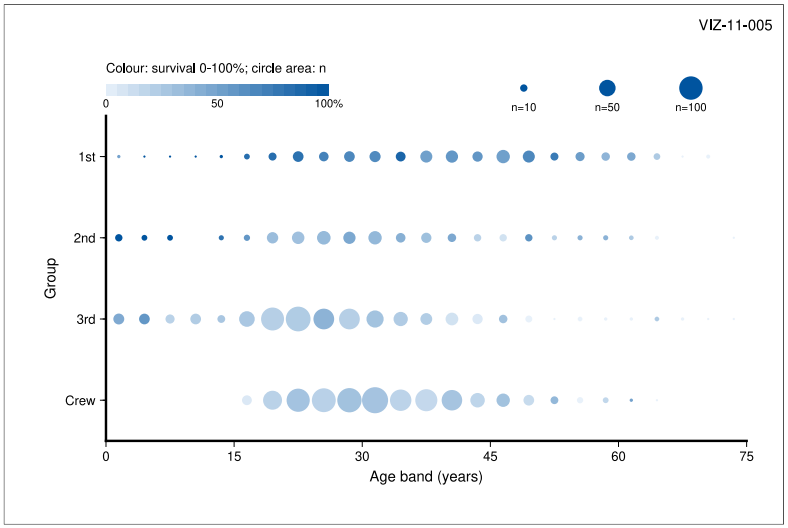
GMT: bubble

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
# GMT variable circle diameters are centimetres; 72 bp = 1 inch.
awk '$4>0 {print $1,$2,$3,$6/72*2.54}' data/cells.tsv | gmt plot -Sc -Cdata/
survival.cpt
```

Actual GMT output



VIZ-11-005 · native vector output

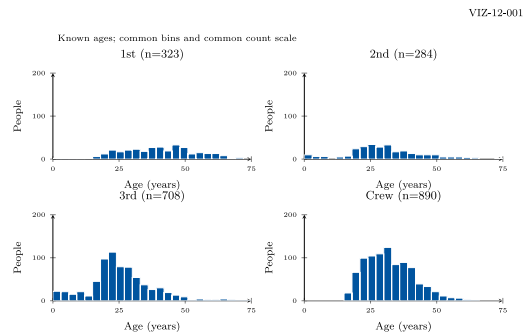
GMT · exit 0

Command or choice	Meaning
`plot -Sc + CPT`	Native drawing method used here.
`cells.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

Age counts as four small multiples

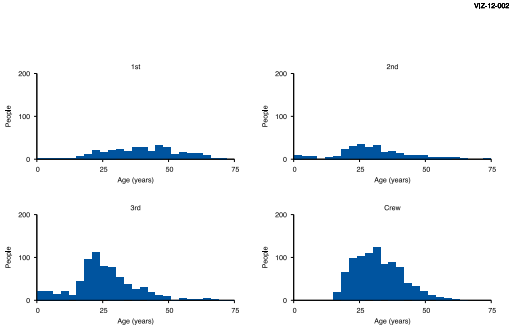
Four panels share the same age bins and a 0–200 count scale. Each panel represents one passenger class or crew membership.

Unlike independently autoscaled panels, the common count scale preserves differences in group size. Known-age panel totals are 323, 284, 708 and 890.



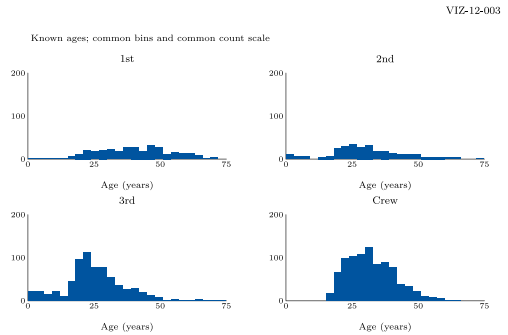
PGFplots / TikZ

VIZ-12-001



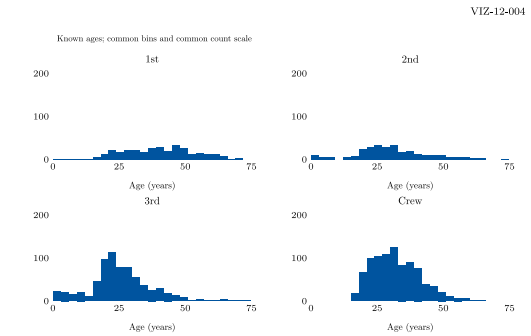
gnuplot

VIZ-12-002



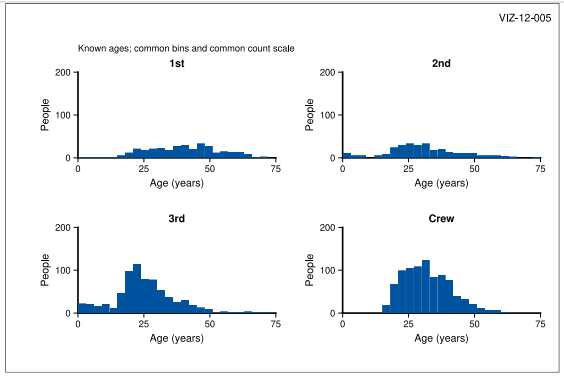
Asymptote

VIZ-12-003



MetaPost

VIZ-12-004



GMT

VIZ-12-005

VIZ-12-001

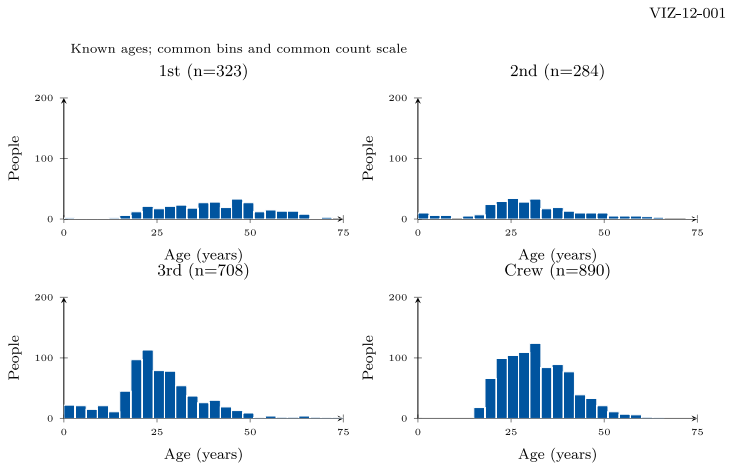
PGFplots / TikZ: facets

A native 2-by-2 group plot fixes the same ranges and bins in every panel.

Drawing commands

```
\begin{scope}[shift={(55bp,155bp)}]
  \begin{groupplot}[
      group style={group size=2 by 2,horizontal sep=40bp,vertical sep=42bp},
      anchor=south west, width=150bp,
      height=65bp, scale only axis,
      xmin=0, xmax=75,
      ymin=0, ymax=200,
      xtick={0,25,50,75}, ytick={0,100,200},
      axis lines=left, tick label style={font=\tiny},
      title style={font=\small}, xlabel={Age (years)},
      ylabel={People}
  ]
    \nextgroupplot[title={1st (n=323)}]
    \addplot[ybar,bar shift=0pt,bar width=6bp,fill=Blue,draw=white,line width=.2bp]
    table[x index=0,y index=6]{data/ages.tsv};
    \nextgroupplot[title={2nd (n=284)}]
    \addplot[ybar,bar shift=0pt,bar width=6bp,fill=Blue,draw=white,line width=.2bp]
    table[x index=0,y index=7]{data/ages.tsv};
    \nextgroupplot[title={3rd (n=708)}]
    \addplot[ybar,bar shift=0pt,bar width=6bp,fill=Blue,draw=white,line width=.2bp]
    table[x index=0,y index=8]{data/ages.tsv};
    \nextgroupplot[title={Crew (n=890)}]
    \addplot[ybar,bar shift=0pt,bar width=6bp,fill=Blue,draw=white,line width=.2bp]
    table[x index=0,y index=9]{data/ages.tsv};
  \end{groupplot}
\end{scope}
```

Actual PGFplots / TikZ output



VIZ-12-001 · native vector output

PGFplots / TikZ · exit 0

Command or choice	Meaning
`groupplot`	Native drawing method used here.
`ages.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-12-002

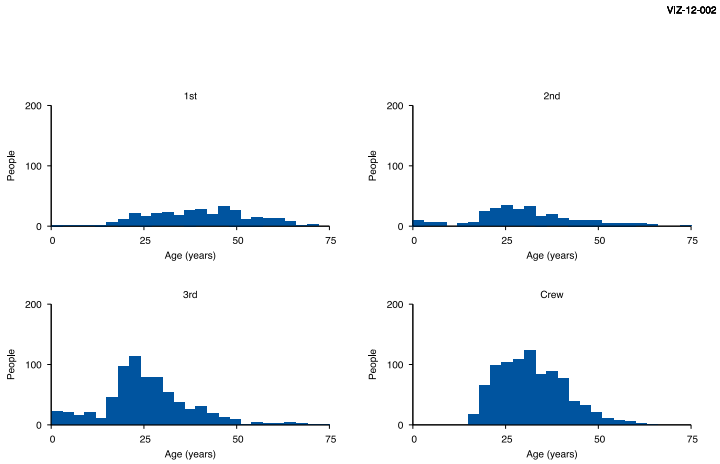
gnuplot: facets

Four native plots reuse the same ranges and corresponding class columns.

Drawing commands

```
set boxwidth 3 absolute
unset label 2
set multiplot
set yrange [0:200]
set ytics 100
set xtics 25
set lmargin at screen 0.13095238095238096
set rmargin at screen 0.4880952380952381
set bmargin at screen 0.5535714285714286
set tmargin at screen 0.7857142857142857
set title "1st" offset 0, -.5
plot "data/ages.tsv" using 1:7 with boxes lc rgb "#00549f"
set lmargin at screen 0.5952380952380952
set rmargin at screen 0.9523809523809523
set bmargin at screen 0.5535714285714286
set tmargin at screen 0.7857142857142857
set title "2nd" offset 0, -.5
plot "data/ages.tsv" using 1:8 with boxes lc rgb "#00549f"
set lmargin at screen 0.13095238095238096
set rmargin at screen 0.4880952380952381
set bmargin at screen 0.17142857142857143
set tmargin at screen 0.4035714285714286
set title "3rd" offset 0, -.5
plot "data/ages.tsv" using 1:9 with boxes lc rgb "#00549f"
set lmargin at screen 0.5952380952380952
set rmargin at screen 0.9523809523809523
set bmargin at screen 0.17142857142857143
set tmargin at screen 0.4035714285714286
set title "Crew" offset 0, -.5
plot "data/ages.tsv" using 1:10 with boxes lc rgb "#00549f"
unset multiplot
```

Actual gnuplot output



VIZ-12-002 · native vector output

gnuplot · exit 0

Command or choice	Meaning
`multiplot`	Native drawing method used here.
`ages.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-12-003

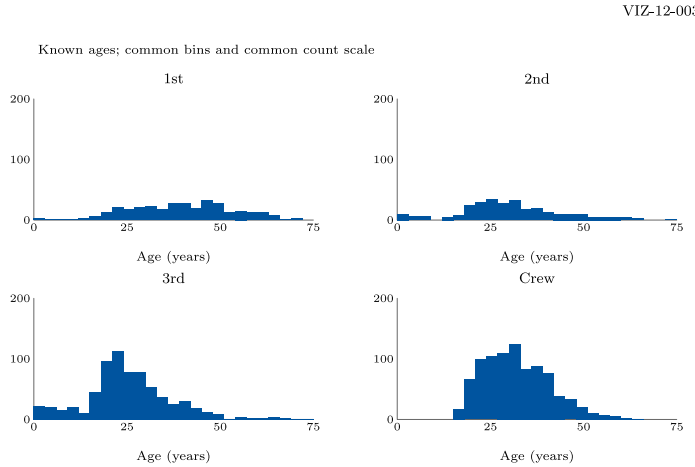
Asymptote: facets

Asymptote draws four separate pictures and translates them into a common canvas, preserving each panel scale.

Drawing commands

```
real[][] d = input("data/ages.tsv").line();
string[] names = {"1st", "2nd", "3rd", "Crew"};
for (int j = 0; j < 4; ++j) {
    real x = 55 + 195 * (j%2), y = 155 - 107 * floor(j / 2);
    picture panel;
    draw(panel, (0, 65)--(0, 0)--(150, 0), gray(.4));
    for (int t = 0; t <= 75; t += 25)
        label(panel, string(t), (2 * t, 0), S, fontsize(6));
    for (int t = 0; t <= 200; t += 100)
        label(panel, string(t), (0, 65 * t / 200), W, fontsize(6));
    label(panel, names[j], (75, 76), fontsize(8));
    label(panel, "Age (years)", (75, -20), fontsize(7));
    for (int i = 0; i < d.length; ++i) {
        real[] v = d[i];
        fill(panel, box((2 * v[1], 0), (2 * v[2], 65 * v[6 + j] / 200)), Blue);
    }
    add(shift(x, y) * panel);
}
```

Actual Asymptote output



VIZ-12-003 · native vector output

Asymptote · exit 0

Command or choice	Meaning
`arrays + native paths`	Native drawing method used here.
`ages.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-12-004

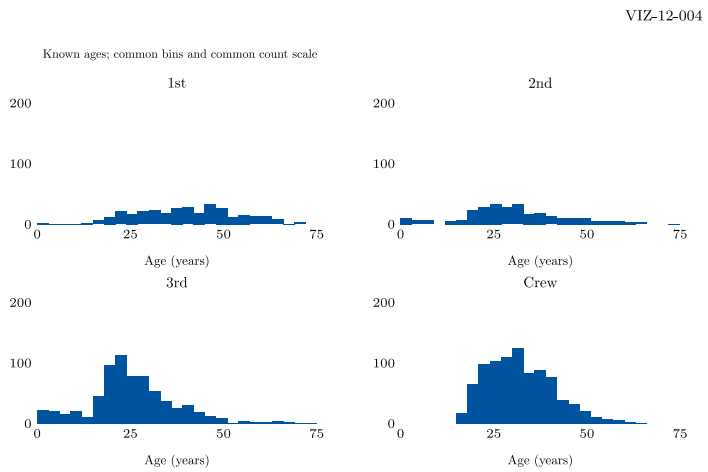
MetaPost: facets

MetaPost composes four native pictures on the same canvas, using a common scale and a separate count column for each group.

Drawing commands

```
numeric n, v[][];
n := 0;
gdata("data/ages.tsv", c,
    n := n + 1;
    for j = 1 upto 10:
        v[n][j] := scantokens c[j];
    endfor
);
picture panel;
for m = 0 upto 3:
    panel := nullpicture;
    addto panel doublepath (0, 65)--(0, 0)--(150, 0) withcolor .4white;
    for t = 0 step 25 until 75:
        addto panel also thelabel.bot(decimal t infont "cmr7", (2t, 0));
    endfor
    for t = 0 step 100 until 200:
        addto panel also thelabel.lft(decimal t infont "cmr7", (0, 65t / 200));
    endfor
    addto panel also thelabel(btex Age (years) etex scaled .7, (75, -20));
    for k = 1 upto n:
        addto panel contour (2v[k][2], 0)--(2v[k][3], 0)--(2v[k][3],
            65v[k][7 + m] / 200)--(2v[k][2], 65v[k][7 + m] / 200)--cycle
            withcolor Blue;
    endfor
    if m = 0:
        addto panel also thelabel(btex 1st etex scaled .8, (75, 76));
    fi
    if m = 1:
        addto panel also thelabel(btex 2nd etex scaled .8, (75, 76));
    fi
    if m = 2:
        addto panel also thelabel(btex 3rd etex scaled .8, (75, 76));
    fi
    if m = 3:
        addto panel also thelabel(btex Crew etex scaled .8, (75, 76));
    fi
    draw panel shifted (55 + 195 * (m mod 2), 155 - 107 * floor(m / 2));
endfor
```

Actual MetaPost output



VIZ-12-004 · native vector output

MetaPost · exit 0

Command or choice	Meaning
`gdata + paths`	Native drawing method used here.
`ages.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

VIZ-12-005

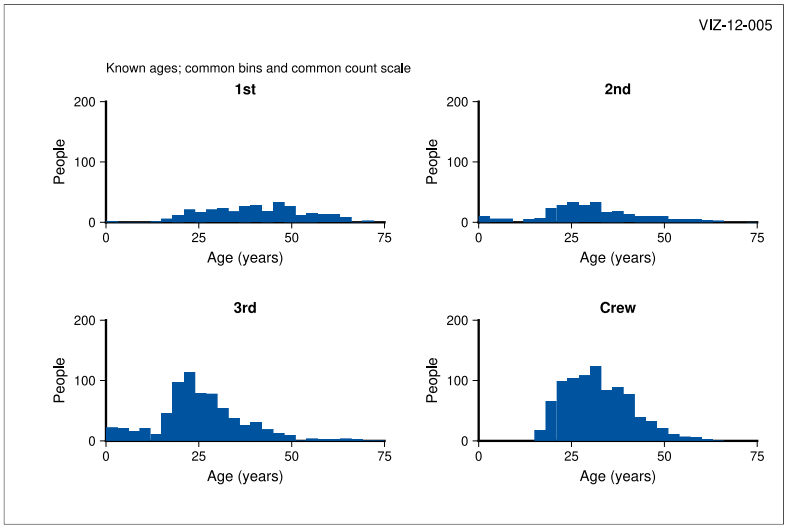
GMT: facets

GMT reads selected columns through its native plotting modules; column expressions are performed by the shown local awk pipeline. The shared tables determine the statistics.

Drawing commands

```
gmt subplot begin 2x2 -Fs150p/65p -M20p/21p -X55p -Y45p
gmt subplot set 0
gmt basemap -R0/75/0/200 -JX? -Bpxa25+l"Age (years)" -Bpya100+lPeople -BWS+t"1st"
gmt plot data/ages.tsv -i0,6 -Sb6p+b0 -G#00549f
gmt subplot set 1
gmt basemap -R0/75/0/200 -JX? -Bpxa25+l"Age (years)" -Bpya100+lPeople -BWS+t"2nd"
gmt plot data/ages.tsv -i0,7 -Sb6p+b0 -G#00549f
gmt subplot set 2
gmt basemap -R0/75/0/200 -JX? -Bpxa25+l"Age (years)" -Bpya100+lPeople -BWS+t"3rd"
gmt plot data/ages.tsv -i0,8 -Sb6p+b0 -G#00549f
gmt subplot set 3
gmt basemap -R0/75/0/200 -JX? -Bpxa25+l"Age (years)" -Bpya100+lPeople -BWS+t"Crew"
gmt plot data/ages.tsv -i0,9 -Sb6p+b0 -G#00549f
gmt subplot end
```

Actual GMT output



VIZ-12-005 · native vector output

GMT · exit 0

Command or choice	Meaning
`subplot`	Native drawing method used here.
`ages.tsv`	Shared numeric input; column definitions are in data/recipes.json.
`Fixed ranges`	Same axis domain and statistical definition in all five implementations.

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