Shift Scheduling White Paper

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Executive summary

Shift Optimization builds complete staff schedules that keep every rule in seconds, not days, and reworks them after a sick call without moving shifts people have already agreed.

Hospitals, care homes and other 24/7 operations still build schedules in spreadsheets or with tools that fill one shift at a time. Planners lose days, gaps surface late, and open shifts are filled at premium agency rates. Shift Optimization compares whole schedules against each other, the approach airlines use to plan crews, to find schedules with fewer gaps, less overtime and agency spend, and fairer workloads. The planner stays in control: the software suggests, the planner decides and publishes.

The challenge

Building a schedule is a giant puzzle: change one shift and three other things move.

Every schedule must balance, at the same time:

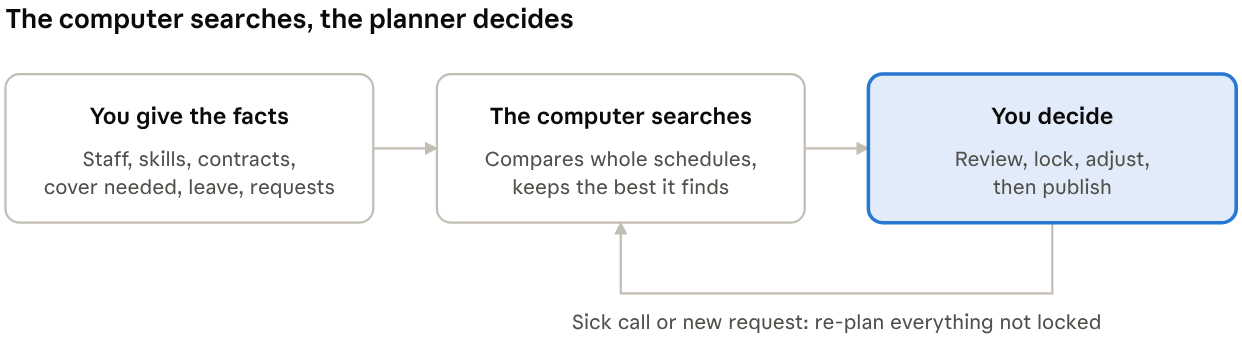
- The right number of staff on every shift
- The right qualifications on each shift
- Hours, nights and weekends each person may work
- Enough time off between shifts and after a run of shifts
- Leave, and days people cannot or would rather not work

Even a small unit has far more possible schedules than anyone can check, by hand or by computer. The skill is searching well.

The cost of searching badly is real. New York hospitals spent nearly four times as much on contract nurses in 2024 as in 2019. About 40% of US nurses intend to leave within five years, and unfair schedules feed that. Better scheduling pays: Hartford Hospital reported 85% fewer overtime shifts and 5 to 8% lower staffing cost in its emergency department after optimizing its schedules (a published third-party result, not ours).

Our approach

You give it the facts, the computer does the searching, and you make the decisions.



how a schedule is made · 3 steps

Most scheduling software fills shifts one at a time by rules of thumb and stops at the first workable answer. Shift Optimization runs on Gradient Path, our own optimization platform, which compares whole schedules against each other. That finds improvements that one-shift-at-a-time tweaking misses.

The idea at its heart is the difference between rules and wishes:

	Rules	Wishes
Treatment	Never broken; a schedule that breaks one is thrown out	Kept where possible; each one missed costs points
Examples	The right skill on every shift; no more shifts in a row than the contract allows; contract hours and weekend limits; nobody scheduled on leave	Fill every shift; give people the shifts and days off they asked for; fewer changes to a schedule people have already seen

Among the schedules that keep every rule, it looks for the one with the fewest points lost on wishes. You decide which wishes matter most. If a shift cannot be filled without breaking a rule, it is left open and shown to you, never quietly hidden.

Think of a GPS. You tell it the roads you may not take; it checks many routes and suggests a good one. You still drive, and you can take a different turn whenever you like.

Capabilities

The planner keeps full control: nothing is published until the planner publishes it.

Capability	What it means for the planner
Complete schedules in seconds	Describe the team, set the cover each shift needs, press solve
Contract rules built in	Consecutive shifts, weekends, weekly hours, rest between shifts and skills, set as options rather than code
Lock and re-solve	Lock agreed shifts; after a sick call or new request, only the rest is re-planned
Open-shift help	Click an open shift to see everyone qualified, best fit first
Drag and drop	Move a shift by hand; the screen warns at once if a rule would break
Agency and overtime	Agency staff and overtime can be included, each with its own cost
Runs in the browser	No installation for the planner

Lock and re-solve matters most in daily use. No vendor we reviewed documents it as a feature, and users complain about its absence.

Who it is for

Shift Optimization starts with US healthcare, where nurse shortages, turnover and agency spend make scheduling most costly.

Customer	How we work with them
Hospitals and health systems	An add-on alongside the scheduler they already run (symplr, QGenda, UKG, Epic)
Skilled nursing and senior living	Staffing is their largest cost; free proof of concept, then a paid pilot

Customer	How we work with them
Workforce-software companies	License our platform so their product schedules better without building an engine

The same approach fits other 24/7 operations: contact centers, security, transport and manufacturing. The underlying platform already runs routing, aircraft assignment and bus-driver scheduling.

Getting started

Customers see the results on their own data before they pay for a subscription.

1. **Benchmarks:** our schedules shown next to the best published schedules.
2. **Free trial:** prospects run it on their own data and check every rule.
3. **Paid pilot:** one team, one schedule cycle, credited to year one.
4. **Case study:** overtime, agency shifts and planner time, before and after.
5. **Subscription:** priced per scheduled employee.

Planners use it in the browser. Software partners connect through an API or license the platform inside their own product.

About us and next steps

Gradient Optimization brings 30 years of airline, rail and manufacturing planning to staff scheduling.

Amal de Silva has built planning systems for airlines, railways, bus operators and manufacturers, at Apple (2018 to 2026), Gurobi, IBM and ILOG, with systems in use at Apple, TSMC, Malaysian Airlines and SMRT. Vincent Gosselin, CEO of Taipy and formerly of ILOG and IBM, advises.

To see Shift Optimization on your own schedules, contact us to arrange a free trial.