WBE - Wastewater-based Epidemiology

December 2021

Who Are We?

2012
Founded

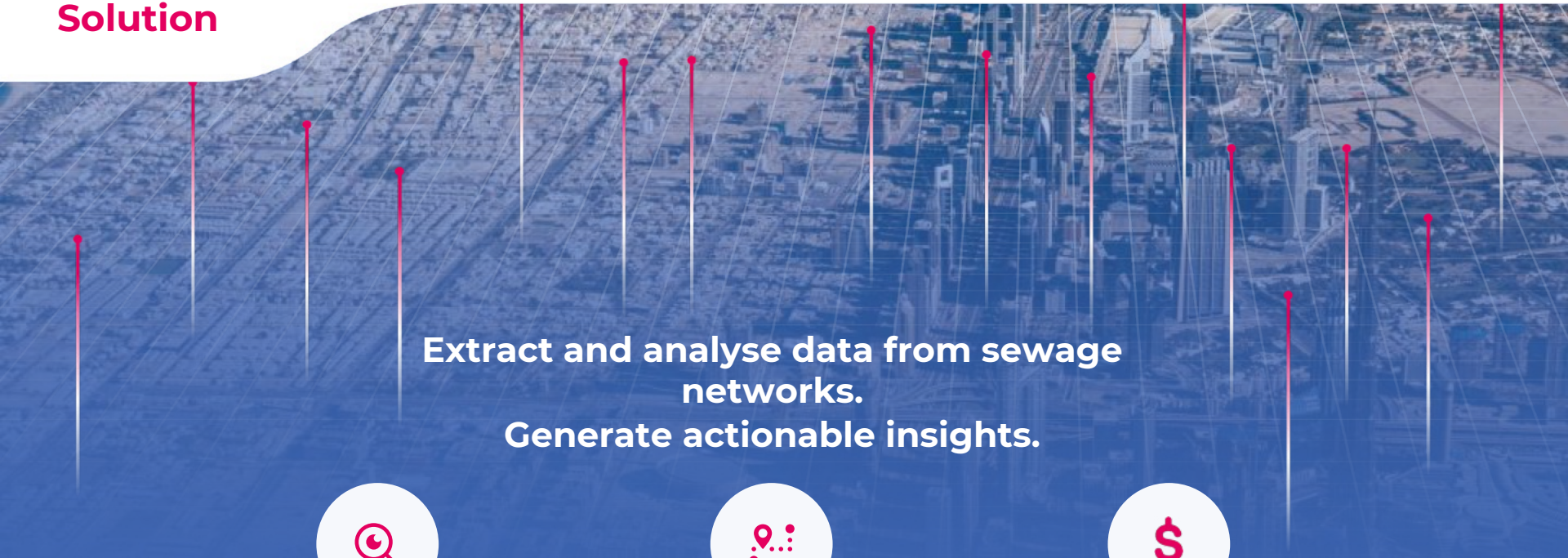
12
Global partners

2
Offices
Tel Aviv, Israel
Denver, CO

25
Clients in major cities worldwide

50+
Employees

Solution



Extract and analyse data from sewage networks.
Generate actionable insights.

Detect

Track

Impact

Wastewater Intelligence| WBE Responding to COVID-19

An early warning system for COVID-19 outbreaks

Kando's WBE solution combines our market-leading wastewater analysis experience with our partners' expertise in, epidemiology, public health, microbiology, and wastewater.

Our end-to-end service detects virus outbreaks and pinpoints infection hotspots in cities, supporting effective public health decision making.

Our academic partners

We’ve partnered with leading experts in:

- Public health
- Microbiology
- Epidemiology
- Wastewater

Prof. Ariel Kushmaro
Department of Biotechnology Engineering, Ben Gurion University of the Negev

Prof. Eran Friedler
Head of the Water and Environment department, Israeli Institute of Technology, Wastewater Processes & Quality

Prof. Jacob Moran-Gilad
Full professor of Clinical Microbiology, School of Public Health, Faculty of Health Sciences, Ben Gurion University of the Negev

Prof. Nadav Davidovitch
Director of the School of Public Health, Ben Gurion University of the Negev, Chair of the Public Health Forum, IMA

Process

Planning

01

Installation

02

Sampling

03

Analysis

04

Zoom in & Continuous Monitoring

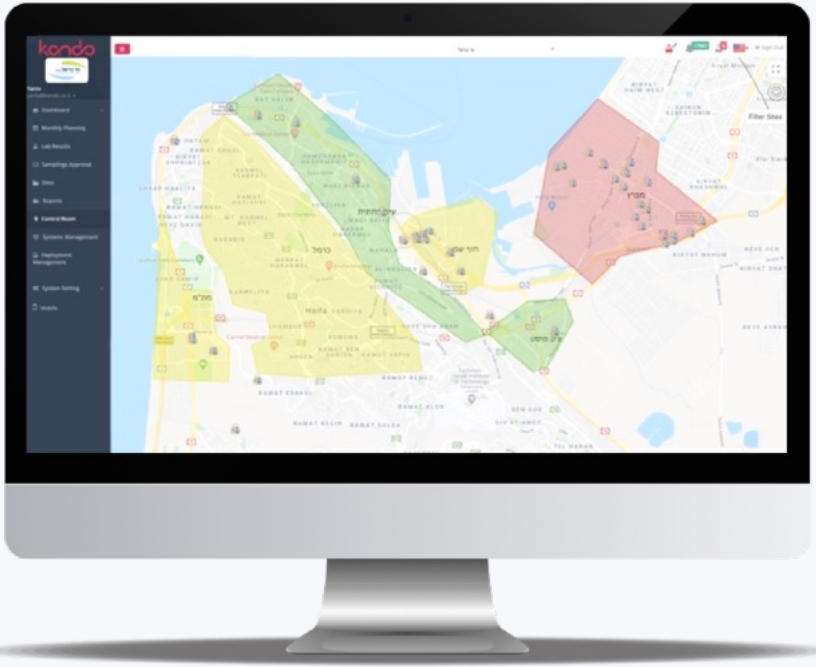
05

Planning |

Defining monitoring areas

Factors include:

- Demographic information
- Network information
- Wastewater discharge trends



Installations |

Automated sampling at optimal locations

How do we install?

- Network GIS
- Upstream population
- Manhole physical properties
- Network trends analysis

Data gathering units are deployed at key locations to give maximum visibility.

Installations |

IoT data gathering units

Kando's IOT data gathering units are deployed within client collection systems.

2. Quality and flow sensors

1. Data logger

3. Automatic sampler

Sampling| Protocol

Composite sampling

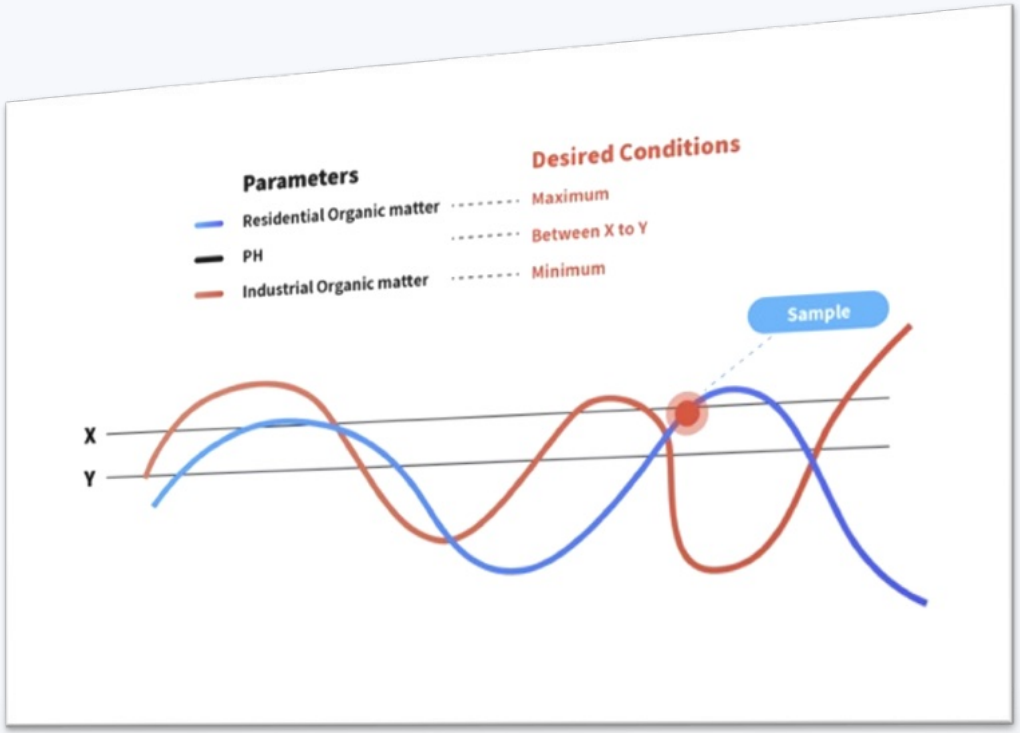
Wastewater flow

Monitoring wastewater flow is essential for calculating the ‘Normalized Viral Load’ (NVL).

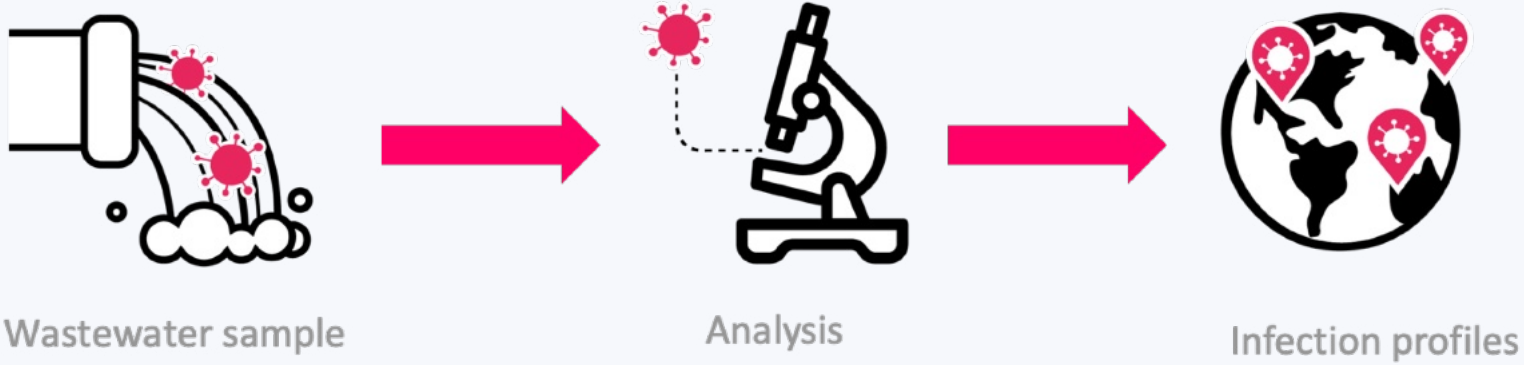
Wastewater quality

Pollution and increased rainfall can distort NVL measurements.

Kando’s solution only takes samples when conditions are right.



Analysis | Supporting enhanced virology lab analysis

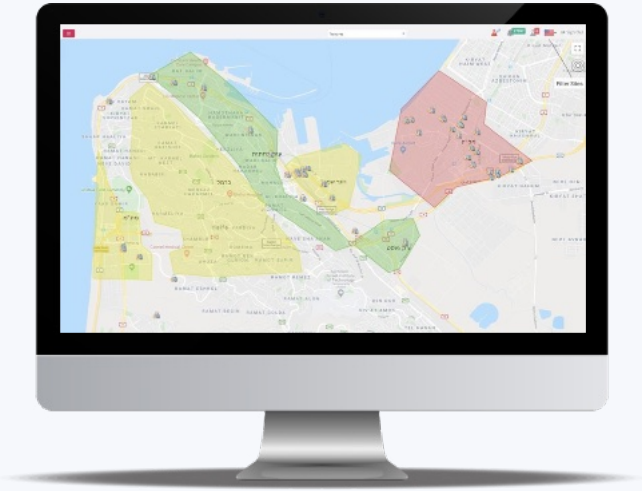


Results |

It takes just 48 hours

to provide targeted analysis of infected areas.

1. Deploy ‘Zoom-in’ units
2. Collect samples
3. Analyze samples
4. Deliver outbreak report



Zoom-in |

Upstream focus

It takes just 48 hours

to provide targeted analysis of infected areas.

1. Deploy ‘Zoom-in’ units
2. Collect samples
3. Analyze samples
4. Deliver outbreak report

Zoom-in | Results

Kando provides infection profiling for:

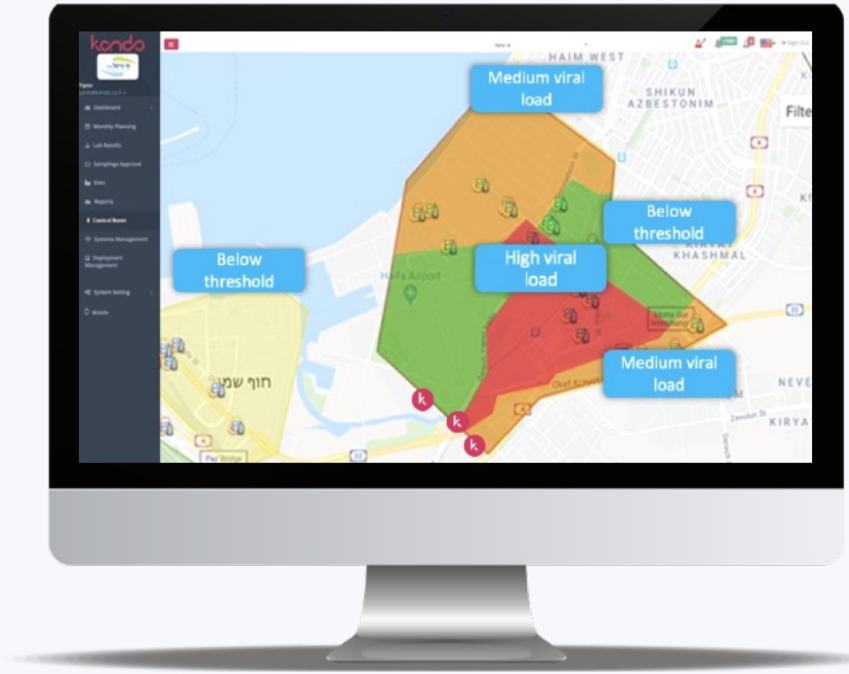
Whole districts

City blocks

Individual single street

Single facilities

Residential homes
Hospitals
Prisons
Military bases
University campuses



Ashkelon | Proof of Concept Pilot

Ashkelon, The ideal location:

- No known COVID-19 cases in the community.
- The city's 250 known cases were contained in a single controlled location (a quarantine hotel).

Ashkelon Project Goals

Establish if Kando's technology can pinpoint virus hotspots.

Improve our understanding Normalized Viral Load (NVL) patterns in wastewater.

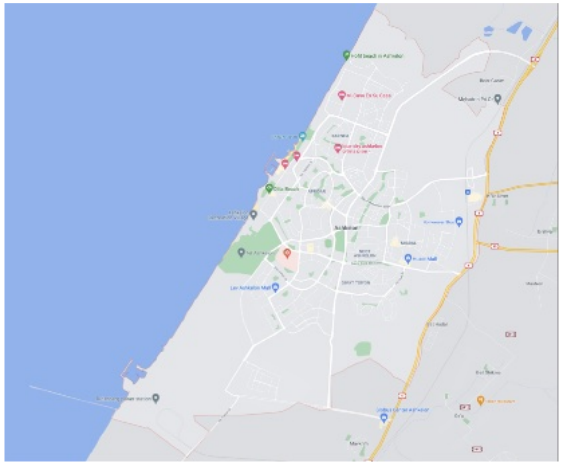
Model the outbreak profile in the surveyed area.

Ashkelon basic information:

Population: c.145,000

Area: 47.8km2

Location: Southern Israel, Mediterranean coast



Pilot design & method | Urban layout and wastewater network

01

Deploy IOT monitoring units at key junctions

02

Set up a focus area around the quarantine hotel

03

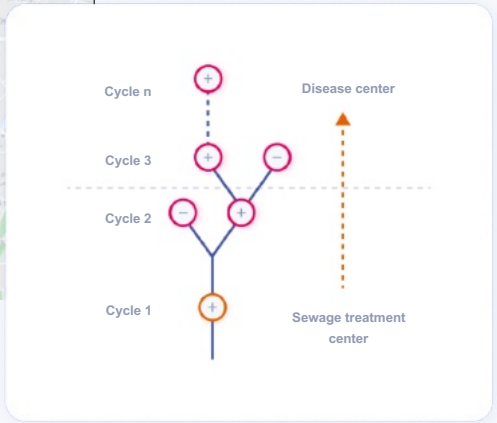
Gather wastewater samples across all the monitoring zones

04

Lab partners analyze samples

05

Correlate results against known wastewater profiles



Pilot | Deployment overview

24 hours to install IOT data gathering units at 14 key locations:

WWTP: Reference point

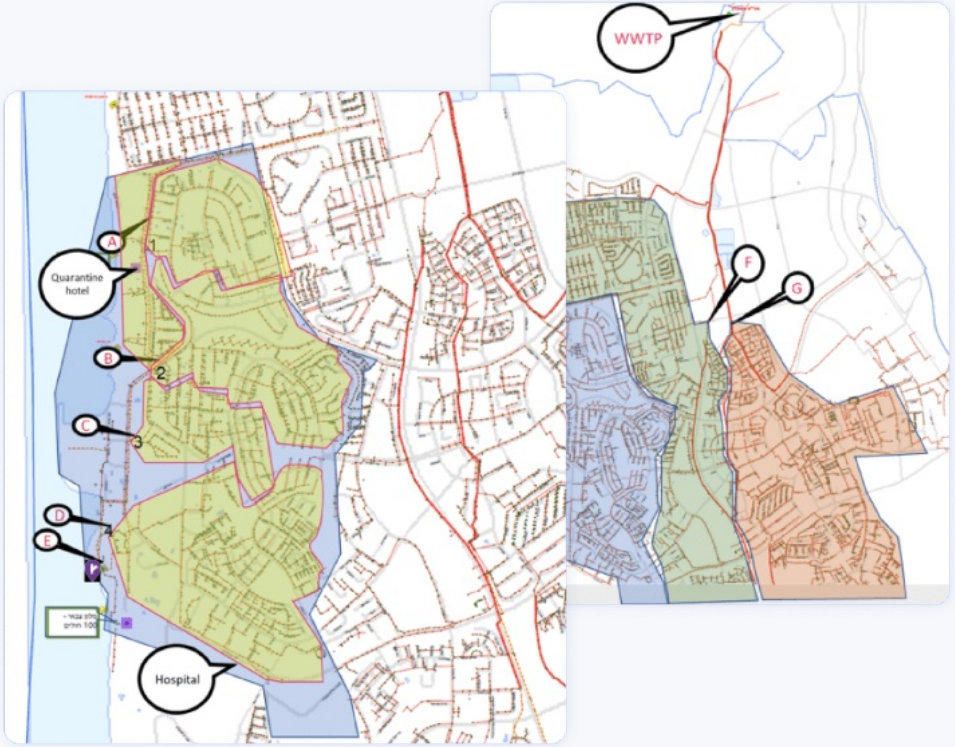
E, F, G: Routine monitoring point (1/3 of the population each)

A, B, C, D: Time of flight & dilution reference points

1,2,3,4: High resolution monitoring points (One drainage basin)

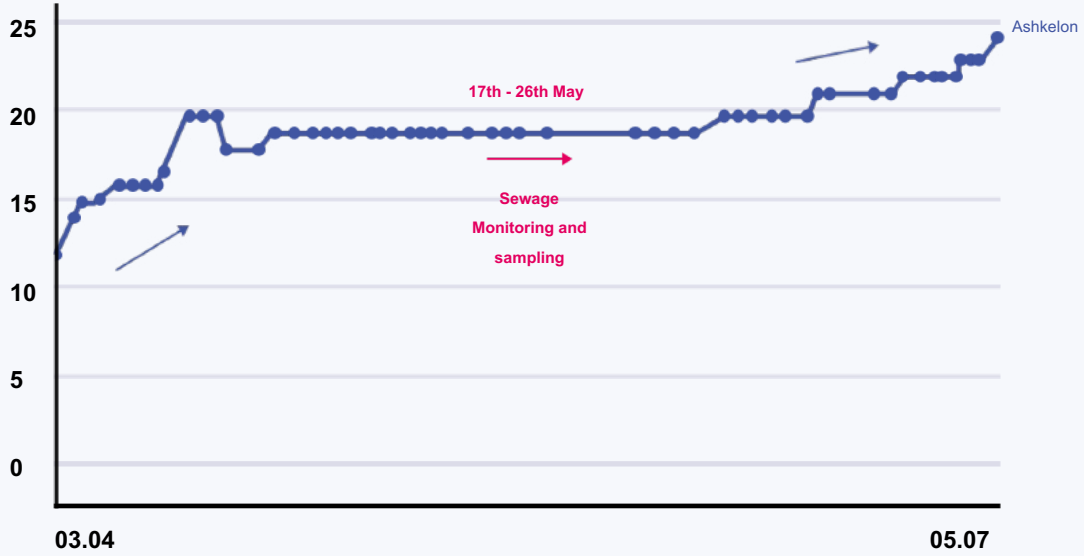
Quarantine hotel: Infection pulse reference point

Hospital: Reference point



Proof of concept | Early detection in Ashkelon

Confirmed patients per 10,000 people (Ashkelon)

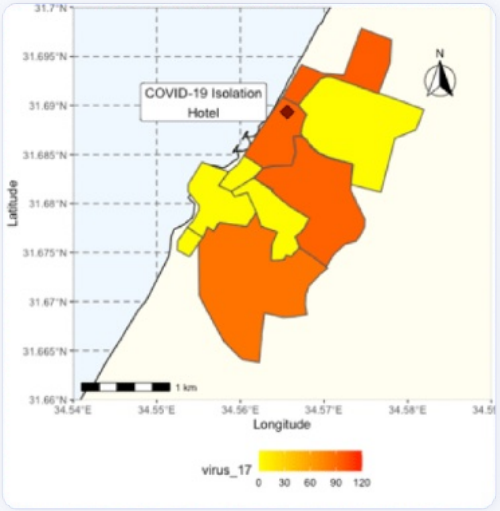


Data source: Ministry of Health

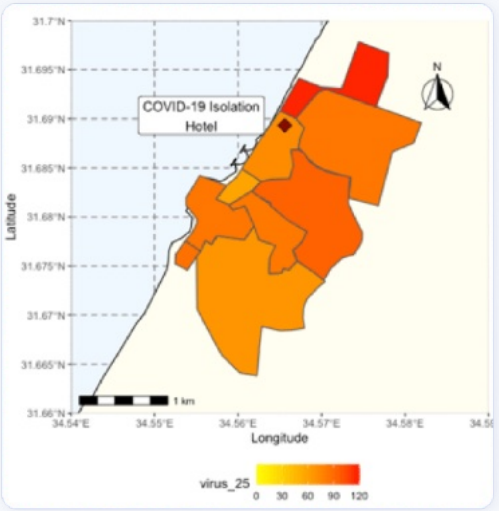
Preliminary results | Early warning

Preliminary results: Pilot deployment area

Week 1: 17th May



Week 2: 26th May



Pilot | Lessons learned

- Pilot Improved NVL profiling
- Improved lab analysis
- Full project cycle methodology - plan, deploy, collect, deliver
- Scaling best practice

  Cost breakdown and optimization

Ido Blank ido@kando.eco

kando.eco