In at the deep end! Reflections on a life of OR practice

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My background

- BSc Physics *1970*
- Ministry of Defence – OR analyst; MSc in OR/Stats part time *1970-1975*
- Met Police (Scotland Yard)– from senior OR analyst to Director of Internal Consultancy *1975 - 2000*
- Met Police - Head of Policy Unit; Assistant Commissioner's right hand woman; Head of Business Change Group *2000 - 2002*
- Independent Consultant; ex president of OR Society and ex VP IFORS

Facts about the Met Police circa 1990

- 28000 police officers
- 15000 other staff : forensic scientists, police car repairers, cooks....etc
- 7 million residents in greater London + visitors
- Area about 1,600 square kilometres
- Local and National functions
- Budget > £ 1 billion p.a.
- Internal consultancy department: around 50 staff (mix of police, work study officers, OR scientists, psychologists, administrators)

Examples of Met project requests

- Optimal location of police stations ?
- Does the Neighbourhood Watch scheme work?
- How can we improve the operation of Criminal Record Office & can we move to a microfiche system? *
- How can we automate Witness Albums?
- How should we prioritise building works within limited budget?
- Which are the best performing police units and why?
- Which routes should our dispatch vans take to minimise time?
- How can we make out a business case for replacing our intelligence system?
- Which computer systems should we develop and in which order over next 10 years? What should be our strategy? *
- How can we rationalise our inspecting bodies?
- How can we distribute our manpower fairly?
- How can we show that London is the safest city in the world? (!)

Example of a Met problem

- 4.5m hard copy criminal record files at Scotland Yard
- Floor collapsing under weight
- No chance of moving offices
- Had to adopt a microfiche solution- microfilm no good because can’t update it
- Needed project to completely re-design the process for handling arrest/conviction info in 6 months and sort out technicalities of microfiche

Team composition

- Detective Ch Supt who was deputy to the head of the records office
- CRO's microfilm expert
- A Chief Inspector who knew the records office processes
- me

Project title

Criminal

Records

Utilising

Microfiche

Project

Evaluation

Team

Criminal

Records

On

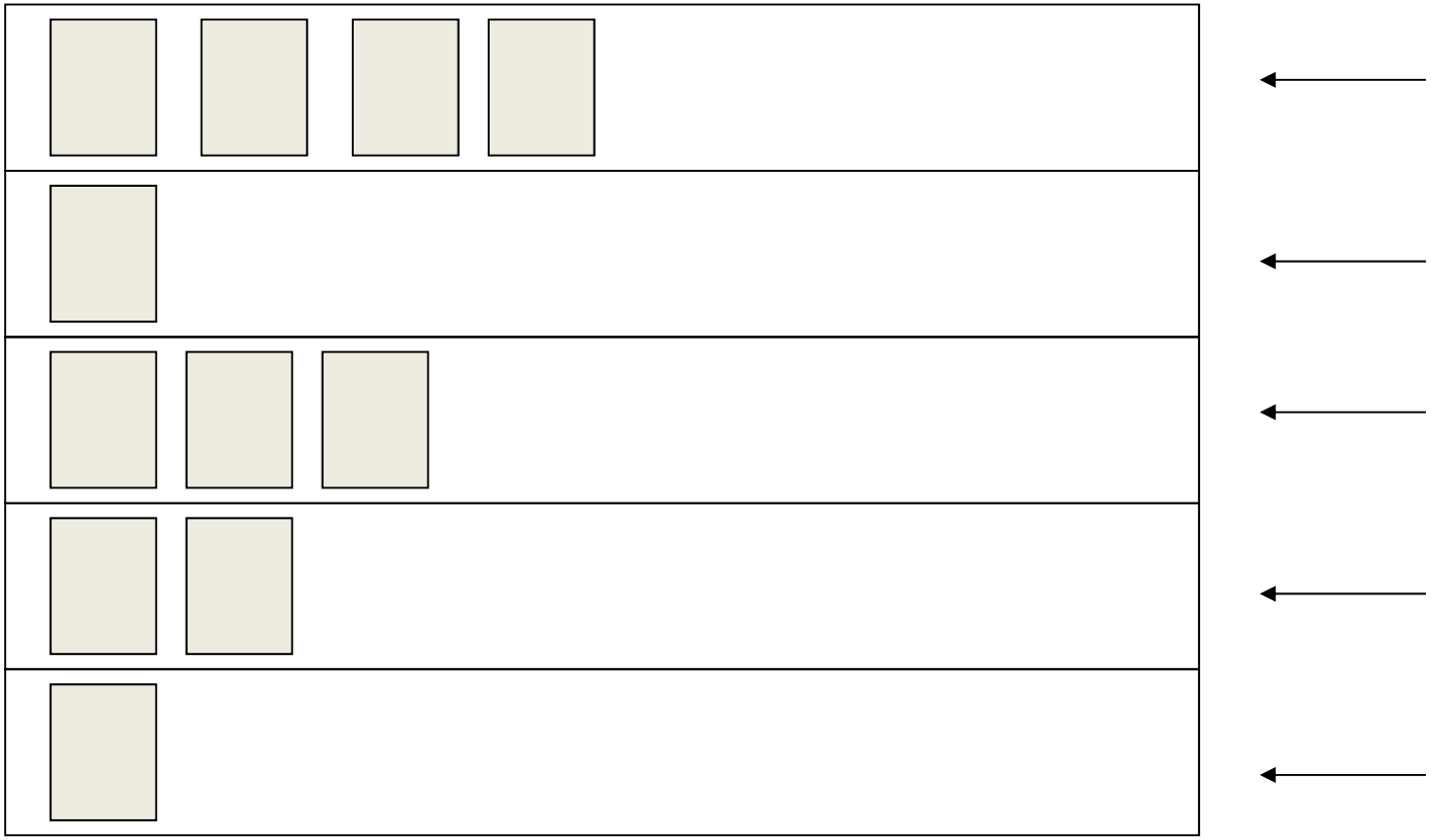
Microfiche

Project

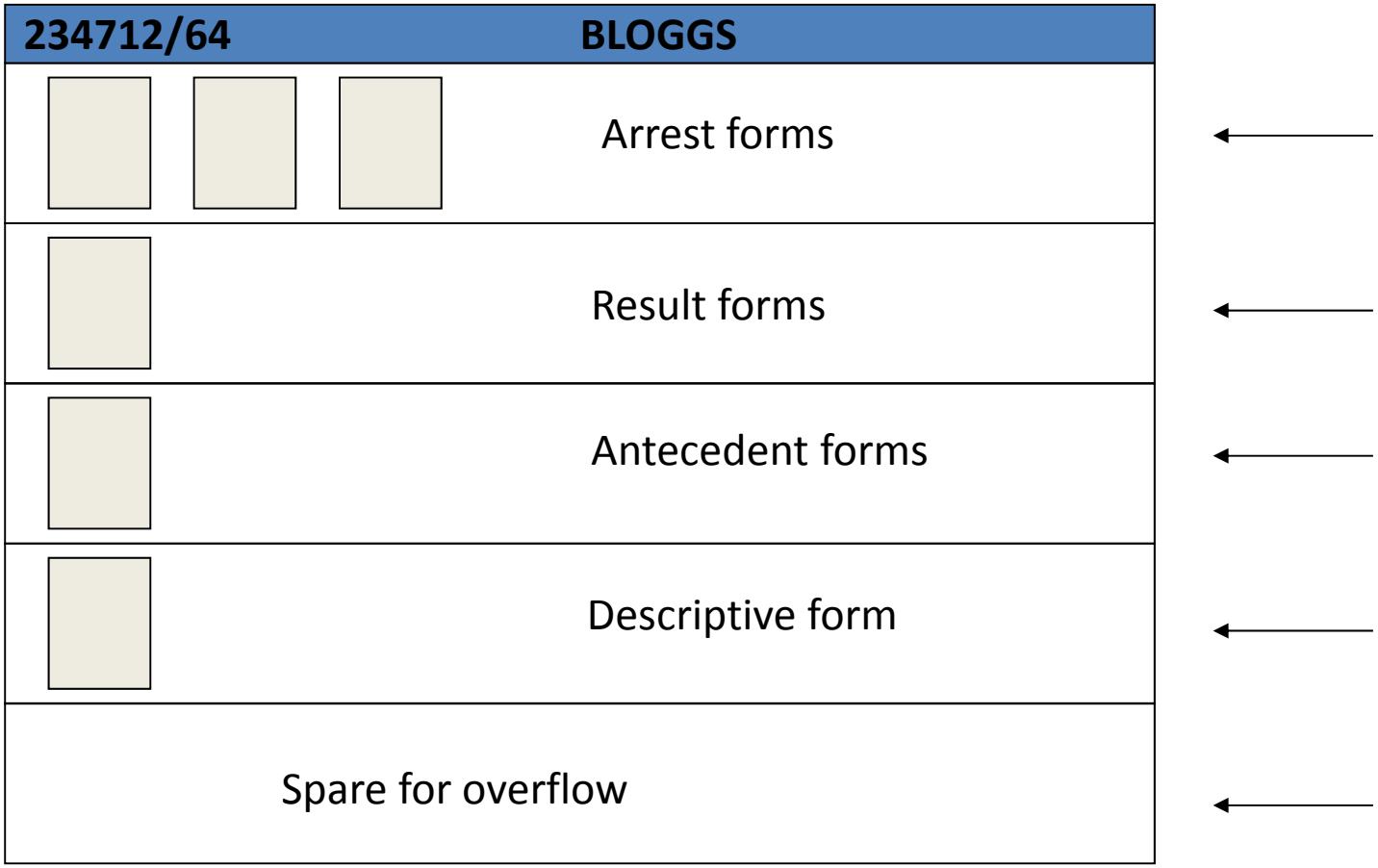
My role

- To help plan the project
- Draw up a critical path analysis for the project
- Write all the progress reports for the steering cte
- Do any analyses needed eg forecasting how many filing cabinets we would need for the next 10 years; estimate how many new criminal files would be created and how many would have to be updated
- Review, change and document many of the processes
- Decide which type of microfiche to use
- Organise tests to find best types of equipment

Microfiche layout



Microfiche layout for CRO



Microfiche viewers

- How would the fiche be read by police investigators?
- All police stations would need fiche viewers -how many and what type?
- Examined three or four commercial police and prisoner-proof viewers/printers
- MCDA used for selecting best on range of weighted criteria (cost, clarity of picture, ease of use, robustness, size, adjustability)

Outcome

- Our system was adopted and implementation commenced during 1978
- System was still being used some 20 years later as back up when the records were eventually computerised
- Was it a success?

  Yes and no! A necessary evil but it worked!
- **Success factors**

  Good supportive team leader, complementary skills of team members, much humour, all pulled together under pressure, clear goal

CRIMESTOPPERS

A charity which helps fight crime

Members of the public telephone the call centre anonymously to give info about criminals and crimes

Possible Reward!!!

The Crimestoppers project mountain to climb

- Call centre was expecting huge increase in volume
- Management had a hunch that changing the shift pattern would help improve performance but couldn't test this or agree amongst themselves
- Decision needed: **which shift pattern will cope best with increased demand**
- One month to get answers
- No documentation of call centre process
- Very patchy data available
- Location awkward for us
- No simulation software

Main Performance Measures

Measure	Target	Actual 2011
% calls answered in 20 secs	90%	86%
Abandoned calls per week	< 200	355 (of 5800) 6.12%
Staff utilisation	Better balance of busy/not busy	Not measured

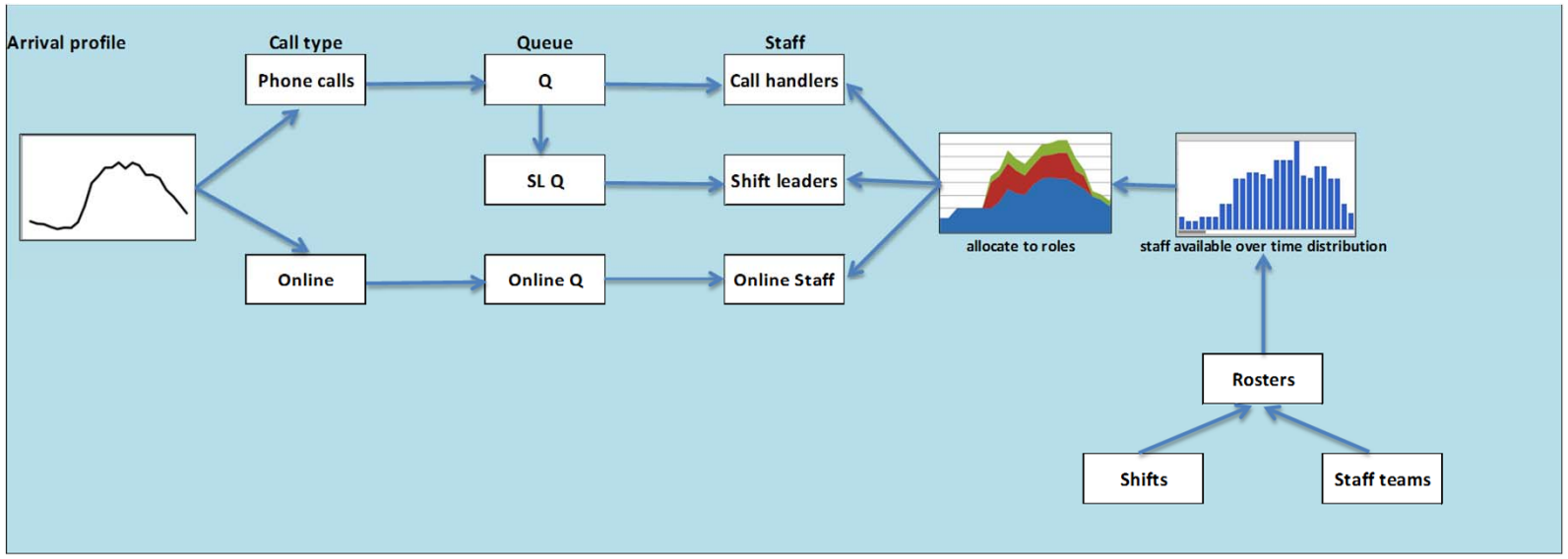
Also: staff costs not to be greatly increased above current levels

Business processes

- **Main categories of staff**
  - call handlers
  - online form handlers
  - Shift leaders
- **Original process**
  - Shift leaders take calls if all call handlers busy
- **Possible alternative process**
  - calls diverted to shift leaders then online staff

Modelling *original* process

2 types of customer contact	3 categories of staff
Phone calls	Call handlers
Online	Online staff
	Shift leaders



Modelling *proposed* process

2 types of customer contact	3 categories of staff
Phone calls	Call handlers
Online	Online staff
	Shift leaders

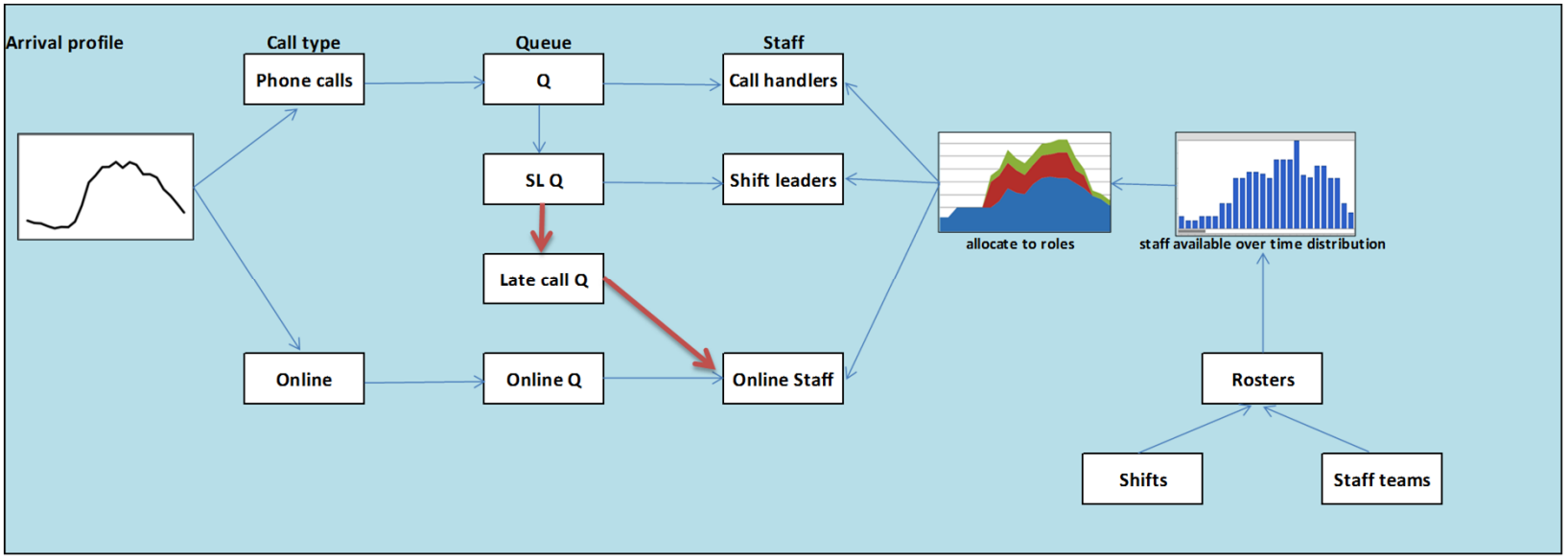


Illustration of original roster patterns

6 days on, 4 days off

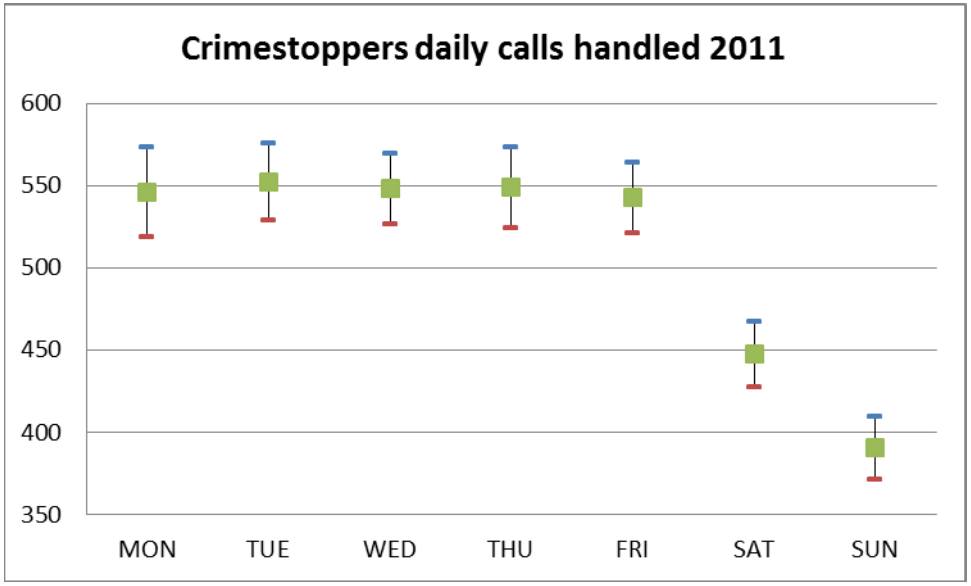
JANUARY	SUN	MON	TUES	WED	THUR	FRI	SAT	SUN	MON	TUES	WED	THUR	FRI	SAT	SUN	MON	TUES	WED	THUR	FRI	SAT
Agent 1	BH/RD	R	E	E	L	L	N	N	R	R	R	R	S	S	L	L	A/L	TOIL	R	R	R
Agent 2	BH/RD	R	E	E	L	L	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R
Agent 3	BH/RD	R	E	E	L	S	S	N	R	R	R	R	E	E	L	L	N	N	R	R	R
Agent 4	BH/RD	R	A/L	A/L	L	L	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R
Agent 5	BH/RD	R	R	R	E	E	TOIL	L	N	N	R	R	R	R	E	TOIL	L	L	N	N	R
Agent 6	BH/RD	R	R	R	E	E	L	L	N	N	R	R	R	R	E	E	L	L	A/L	A/L	R
Agent 7	BH/RD	R	R	R	E	E	L	L	N	N	R	R	R	R	E	E	L	L	N	N	R
Agent 8	BH/RD	R	R	R	E	E	L	L	N	N	R	R	R	R	A/L	A/L	L	L	N	N	R
Agent 9	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R	R	E	E	L	L	N
Agent 10	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R	R	E	S	L	L	N
Agent 11	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R	R	E	E	L	TOIL	TOIL
Agent 12	B/H	TOIL	R	R	R	R	E	TOIL	L	L	N	N	R	R	R	R	E	E	L	L	N
Agent 13	L	L	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R	R	E	E	L
Agent 14	L	L	N	N	R	R	R	R	E	E	L	L	N	TOIL	R	R	R	R	S	S	L
Agent 15	L	L	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R	R	E	E	L
Agent 16	B/H	L	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R	R	E	E	TOIL
Agent 17	E	E	L	L	N	A/L	R	R	R	R	E	E	L	L	N	N	R	R	R	R	E
Agent 18	E	E	L	L	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R	R	S
Agent 19	E	E	S	S	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R	R	E
Agent 20	B/H	E	L	L	N	N	R	R	R	R	E	E	L	L	N	N	R	R	R	R	E

Key: E=07:00-16:00 M=09:00-18:00 L=16:00-01:00 N=22:00-07:00 R=rest day

Data needed for model

- Incoming call volumes – distribution by hour of day, day of week
- Time to answer calls and do follow up tasks- distribution
- Number of staff on duty across the day and week
- Break times and durations
- Targets to be met

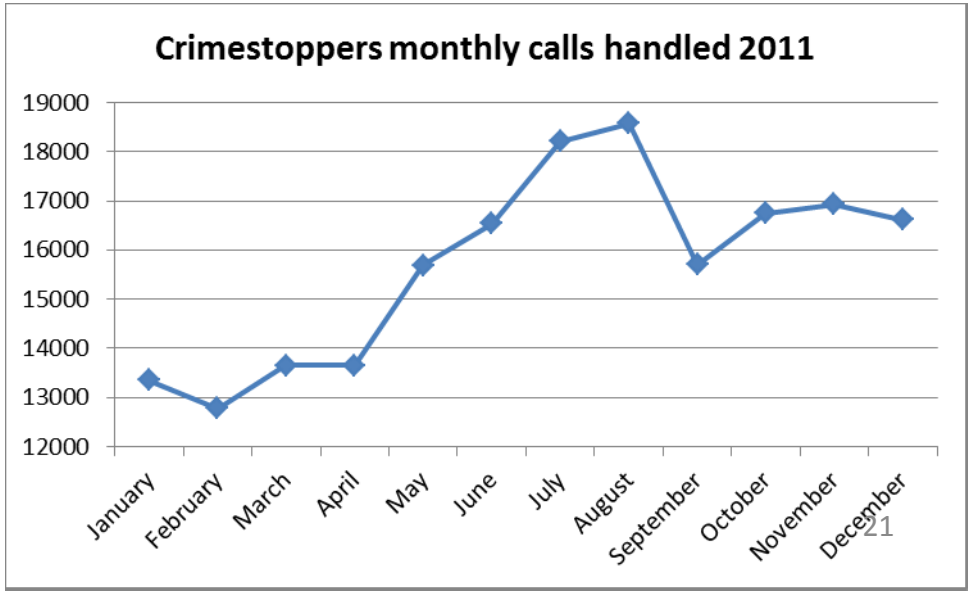
Analysis of 2011 calls data



Call volumes similar
Monday - Friday

Additional business was being taken on during year.

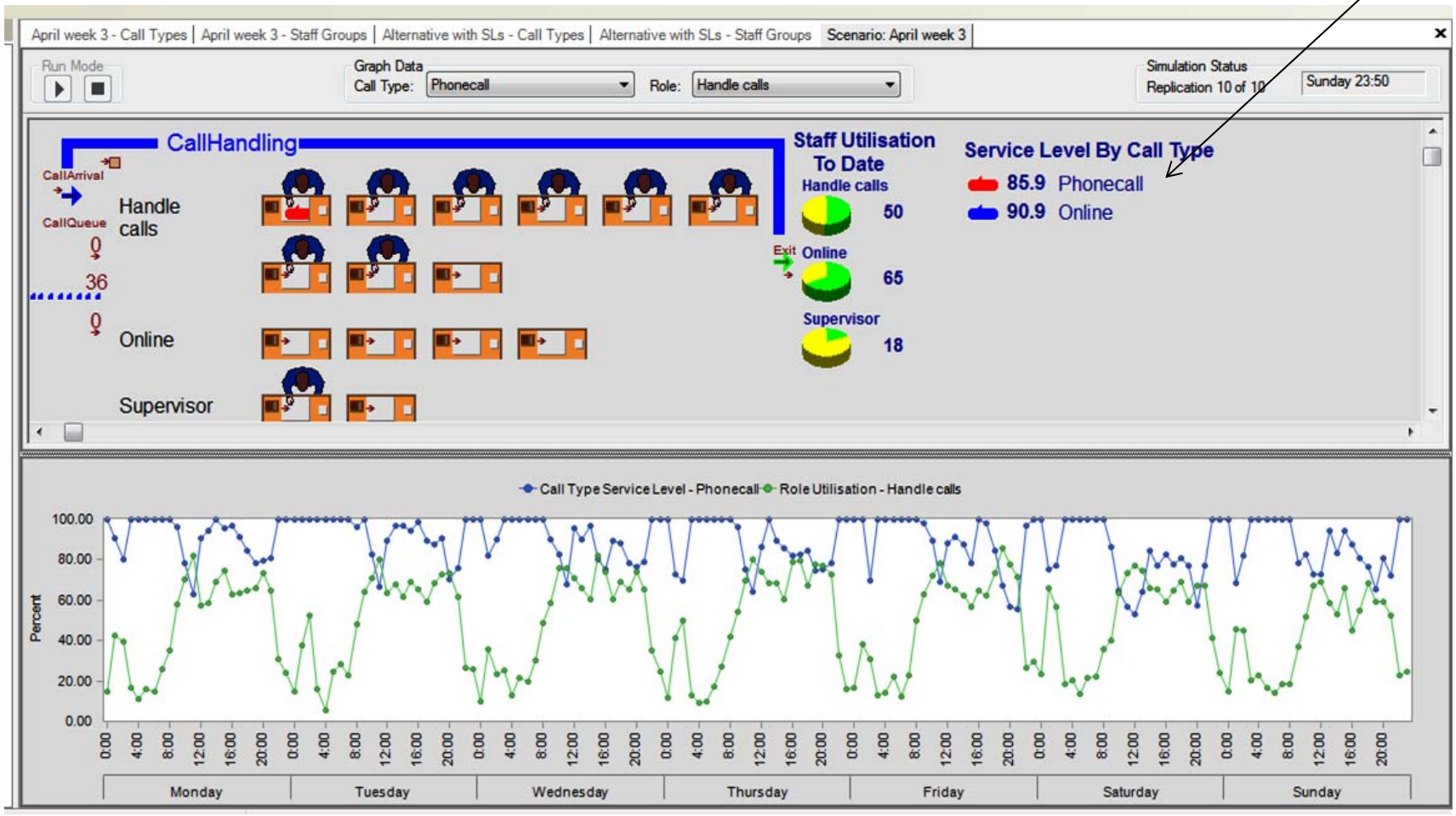
Peak in summer 2011 was a result of the riots.



Screenshot of 1 week's run

using current shifts

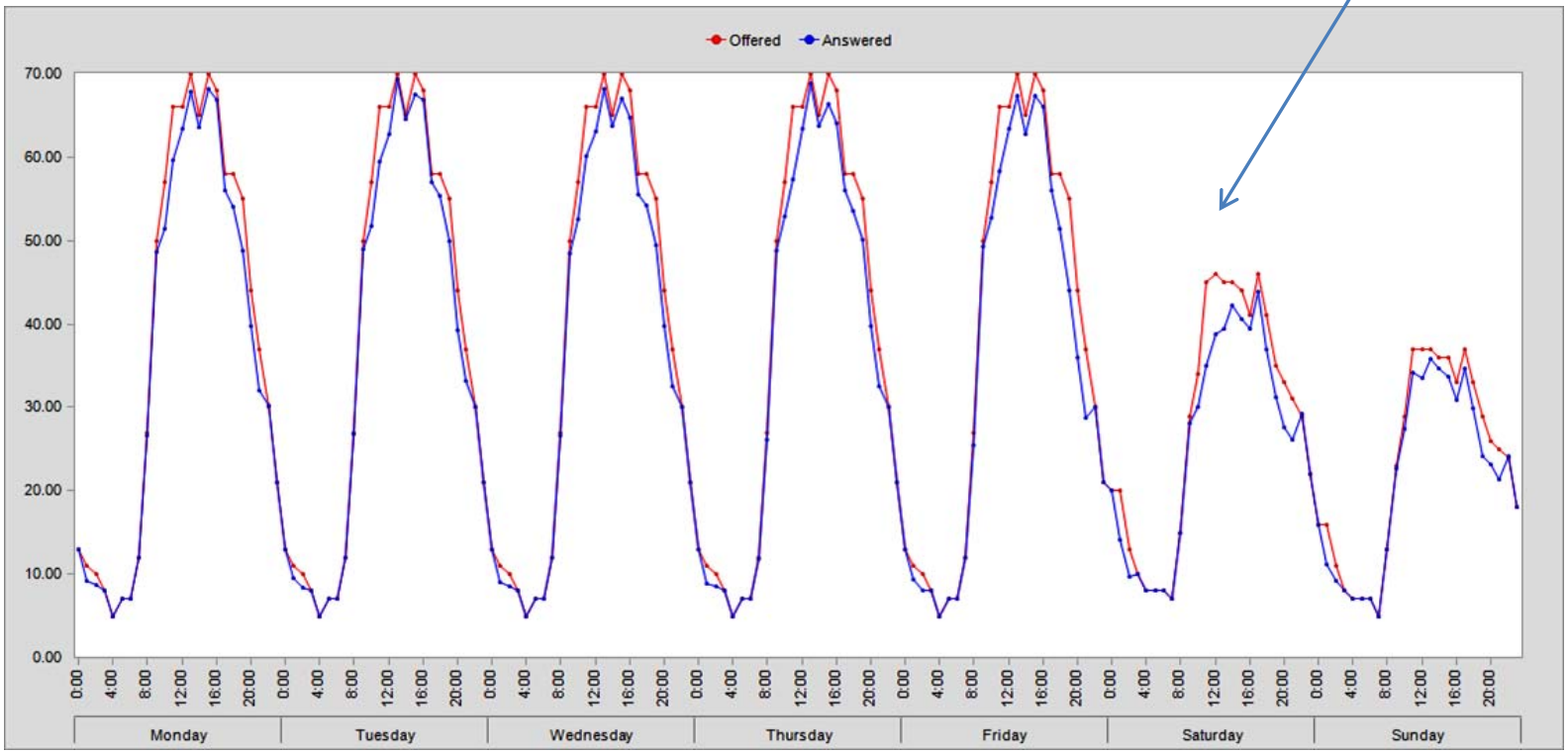
Target: **90%** of calls to be answered in **20** seconds



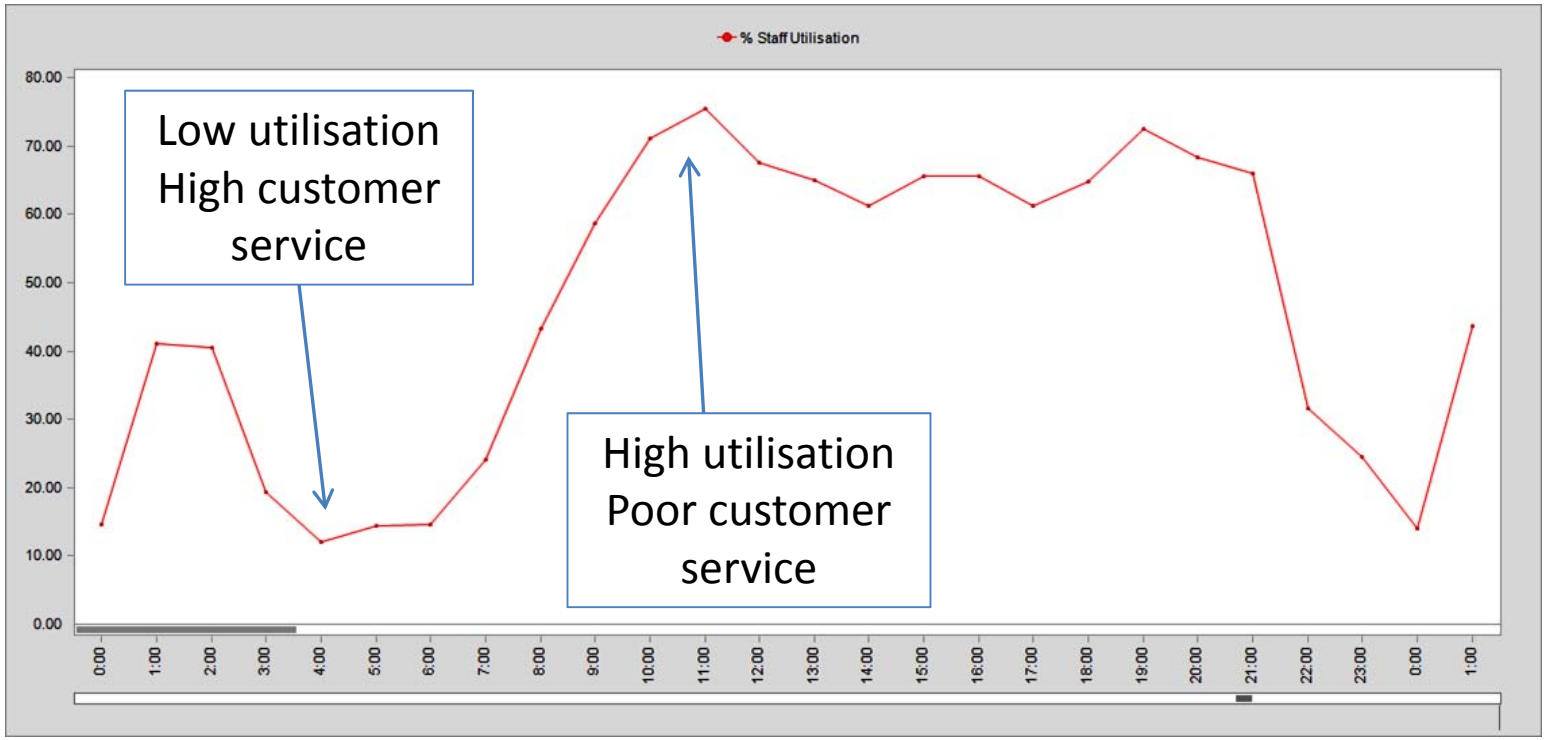
Model outputs: current shifts

phone calls offered and answered

Problem with Saturday



Model outputs: original shifts
call handling staff utilisation on Saturday

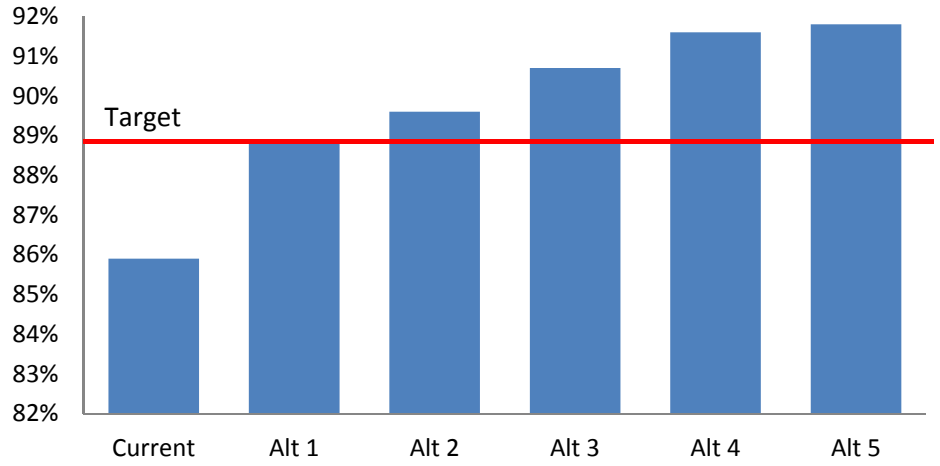


Inefficient use of staff over 24 hour period

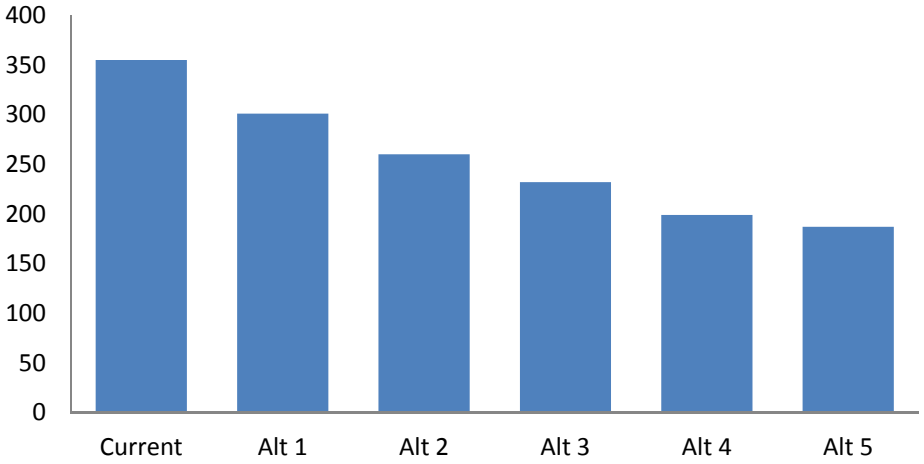
Iterative improvements

Results for an average week

% calls answered in 20 seconds



Abandoned calls in week



Alternatives modelled

1

Client initial proposal - longer shifts

2

as 1 with some part time weekend shifts added

3

as 2 with amendments to weekend shifts

4

as 3 but extending one shift

5

as 4 but changing start times for early shifts

And then…….

- Modelling work complete, shifts agreed June
- Phone call from Crimestoppers in August:
  - staff don't like proposed shifts
  - they have a proposal of their own
  - can you check this out?
- Took opportunity to get some actual data
  - for April – August
  - phone call patterns close to estimated
  - some concern with online form data
- Staff proposal more expensive but
  - no better service

And what happened?

- New rosters introduced Jan 2013
- Managers pleased (verbal)
- Early Feb we were told that results were great! The staff were able to deliver a reduction in lost calls and better performance against target.
- **Success factors**: good visual simulation tool enabled working *with* the client

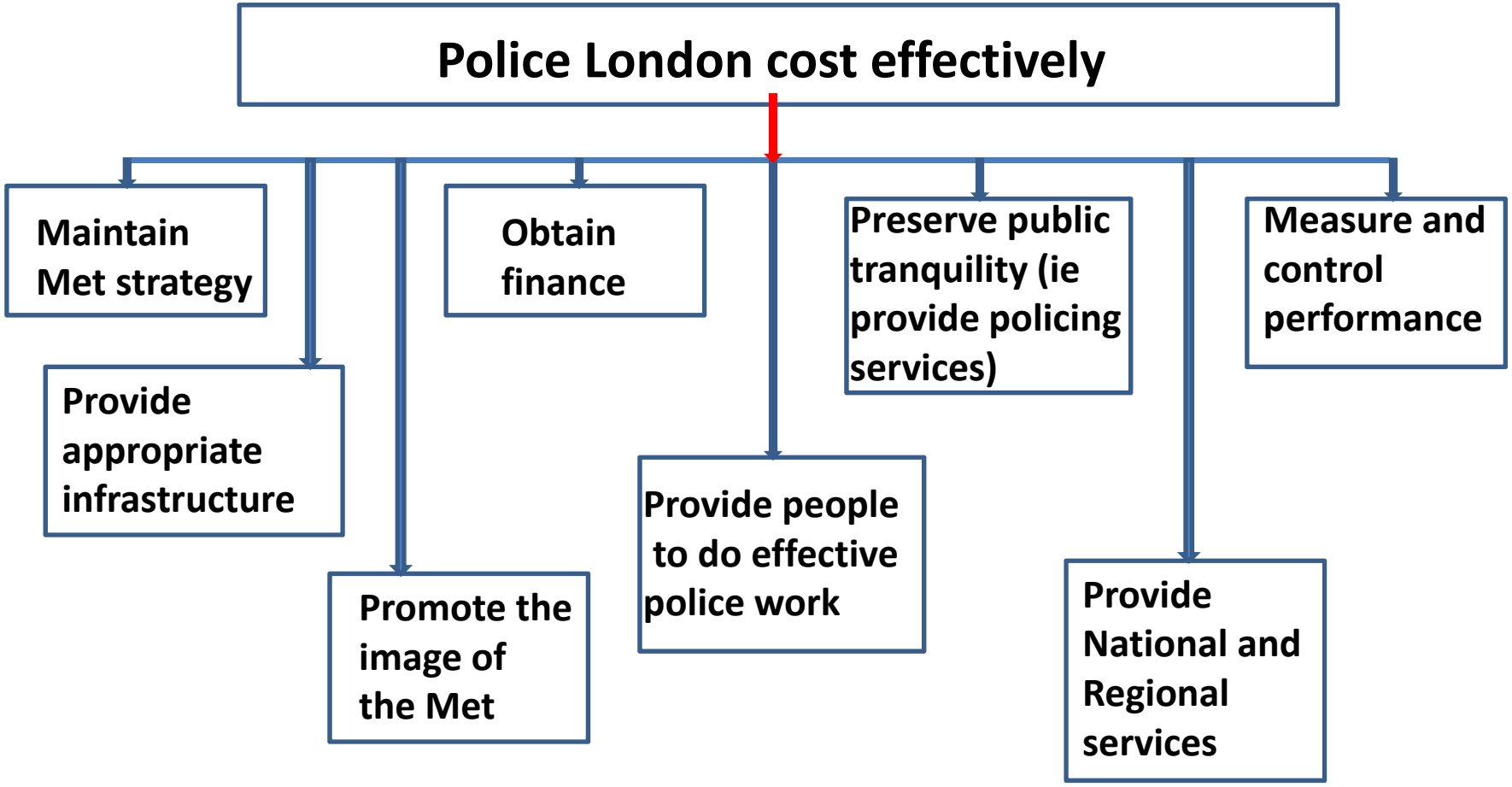
Met Information Strategy
Why needed?

- Over 200 legacy systems
- Many systems needing replacement
- Much double/triple entering of info
- Systems didn't talk to each other
- Many new systems required
- Lack of info where needed
- Tiny budget

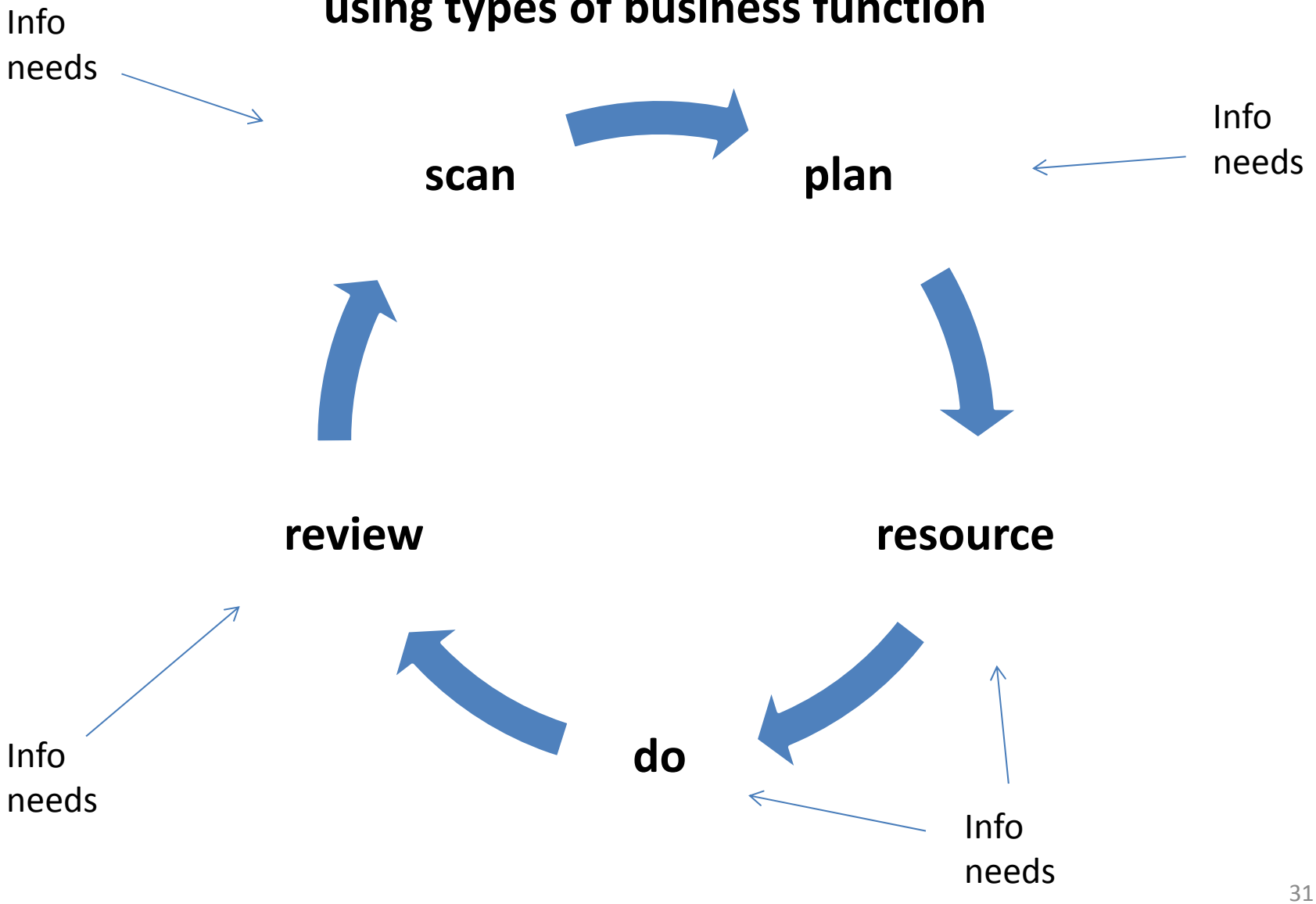
Met Information Strategy - steps in project

- Produced a hierarchical business model of all Met functions
- Analysed the model to see what information systems would improve the functions
- Produced a data model showing info entities and relationships
- Plus a usage matrix showing links between systems and entities
- Listed, grouped and ranked potential systems v weighted policing objectives
- Established technical implementation order required
- Analysed inter-relationships between systems
- Produced 10 year implementation plan options for management showing costs v impact on policing objectives

Top level hierarchical business model



Template for producing business model using types of business function



Outcome

- A ten year plan was adopted
- The IT dept took on the maintenance of the data model
- My dept set up a section to support the Strategy
- Some of the major systems were introduced but then pressure built to devolve computing to fit a new structure of the Met!

Lessons

- Competent/respected police team members supported by experts were vital to enable support for such a large project
- The need to appoint a high level respected sponsor
- The need to involve everyone affected as much as possible
- Workshops/simple leaflets were valuable to *sell* the strategy - you can never over-communicate!
- Don't try to plan too far ahead in detail in a technology project!

Tips for dealing with clients

- Find out about, and keep communicating with your client
- Get to know secretaries! Find out about the culture.
- Try to see the problem from the client's point of view and the point of view of those affected.
- Identify other stakeholders and their level of influence.
- Think very carefully about the real problem behind the request and don't be afraid to challenge the client (diplomatically!).
- Don't assume the data are right – check the source.
- Use project management procedures and plan projects carefully ; identify risks and communication strategies.
- Keep a sense of humour and build in the fun!

Top tip:

Don’t forget:

‘Old age and treachery will always defeat youth and intelligence!’

David Mamet

Thanks for listening!
Questions?

May all your clients be contented ones!