Redistricting and Geographic Deployment at the Ottawa Police Service
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Introduction

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Adding some context

BACKGROUND
Ottawa Police Service Initiative (SI)

- Created with the intention of addressing policing challenges in Ottawa
  - Changing demographics, population growth, budget constraints, growing demand for service, and complexity of crime
- Frontline Deployment Project (FLD)
  - Subgroup within SI
  - Aimed at improving community safety and increasing the efficiency & efficacy of frontline services
- Redistricting Project (Part of FLD)
  - Launched in late 2015, completed in mid-2016, implemented in early 2017
Previous Environment

- System created in 2007
- 674 Atoms
- **Atoms grouped into 49 patrol Zones**
- Zones grouped into 6 Districts
- Districts grouped into 3 Divisions
- Unit assigned to a patrol zone
  - By 2015, units were responding to calls within their assigned zones approx. 32% of the time
OBJECTIVES & CONCEPT
Objectives

• Use an evidence-based approach
• Achieve per-unit workload parity across the City
• Achieve service goals and standards
  – Reactive, Proactive, and Administrative time
  – Optimize Priority 1 & 2 response performance
• Transition to Sector Policing Model
  – Preservation of neighbourhood integrity
• Facilitate information sharing
Ottawa Neighbourhood Study (ONS)

- 108 neighbourhoods
- Neighbourhood profiles described by over 117 variables
  - Four additional “Crime” variables added
- Intended to “better define Ottawa neighbourhoods and measure and map neighbourhood social determinants of health amenable to policy interventions”
- Data sources: Canadian Census, City of Ottawa, real estate maps, National Capital Commission, Ottawa Public Health, University of Ottawa, etc.
- http://www.neighbourhoodstudy.ca
Research & Consultation

- Research **best practices** and consult **academic literature**
- Best practices survey disseminated to 12 police services (Canada and USA)
  - Follow-up interviews with the three that were most comparable to our goals and jurisdiction
- **Unique challenge:** Ottawa’s dense urban area and large rural area
Methodology

- **Delineate** urban and rural geography
- Calculate total 2015 **service effort** for each call and spatial join to ONS Neighbourhood
- **Cluster** ONS Neighbourhoods to create Sectors
  - Esri Business Analyst extension, Territory Design solution (Urban/Suburban)
  - ArcGIS Online, Location Allocation & Drive-Time Analysis (Rural)
- **Validate** model internally through user group feedback
The Data

- 2015 Computer Aided Dispatch (CAD) data
- Total service effort for all Priority 1 to 4 calls
  - Service effort (reactive workload) = travel time + on scene time for all units
- All dispatchable unit types
Workload

• Total workload capacity per unit in a **Sector**
• Three (3) shifts (D/A/M) x 10.75 hours = ~32 hrs
• Total workload capacity in a **24 hour period** is 32 hours
• 32 hours per day x 365 days = **11,680 hrs** per year
• **Optimal** (40% of Sector Total) range of 4,200 – 5,200 hrs per Unit
• **Threshold** limit of 6,000 hrs per unit
Workload

11,680 Hrs (Zone)

- 25% ADMIN
  2,920 Hrs/Yr (15 min/hr)
- 17% PROACTIVE
  1,985 Hrs/Yr (10 min/hr)
- 58% REACTIVE
  6,774 Hrs/Yr (35 min/hr)

Pre-Redistricting

11,680 Hrs (Sector)

- 20% ADMIN
  2,336 Hrs/Yr (12 min/hr)
- 40% PROACTIVE
  4,672 Hrs/Yr (24 min/hr)
- 40% REACTIVE
  4,672 Hrs/Yr (24 min/hr)

40/40/20
Challenges

- Jurisdiction is 2,796 km²
- Call volume concentrated in populated areas
- Staffing allocation: which comes first?
- ONS neighbourhood boundary issues
THE MODEL
Esri Business Analyst

- Territory Design solution
- “Create, automatically balance, and maintain territories”
- Automated creation and dynamic editing
Urban Sector Creation

- **Example**: Sector 16
- Made up of 7 ONS neighbourhoods
- Sum of Service Effort Hours = 14,843.8 hrs
- 3 Units required

*Not actual statistics. For demonstration purposes only.*
What About Rural?

• Less densely populated; calls for service are fewer than in Urban areas
  – Workload cannot be balanced with Urban Sectors
• Population more widely dispersed
  – Takes longer to drive to calls
• Focus shifts from balancing workload to maintaining emergency response performance
Rural Sector Design

- Same 2015 dataset used to design the Urban Sectors, but included Priority 1 & 2 calls only
- Identified 16 candidate locations with the highest call volume (population centres)
  - Point Density tool
  - Similar to Post Policing
- ArcGIS Online
  - Location Allocation and Drive-Time Analysis used to identify the 8 best candidate locations from which the highest % of 2015 emergency calls could be reached within 15 min or less
Examining the model

- Validated using 2013 and 2014 workload data
- A series of workshops were held with frontline officers to review the proposed Sectors
- Considerations or concerns:
  - Geographic and access issues
  - Response considerations (backup)
  - Officer safety concerns
  - Points of interest / hot spots
  - Future development
Accomplished

• Created a total of 19 patrol Sectors
  – 15 Urban / Suburban
  – 4 Rural
• Maintained ONS Neighbourhood integrity as much as possible
  – Changes to shoreline, developing areas, Greenbelt, and Manotick
• Laid the foundation for the Staffing project
• Supported emergency response performance (in theory)
• Facilitated the sharing of information
QUESTIONS?
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THANK YOU